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BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

Vol. 37.] 1940. [No. 2.

SUMMARY OF RECENT ABSTRACTS.*

II. YELLOW FEVER.

Distribution and Epidemiology.

JAMES (pp. 19, 631) gives figures from S. America and Africa of cases and deaths for the year ending 30th September, 1938. In British Guiana suspected jungle yellow fever has been reported, positive protection tests have been obtained with sera from the Sudan, and it is possible that the disease may be present in Abyssinia. FINDLAY (p. 633) also shows that the endemic area in Africa extends to Abyssinia, and that there is serological evidence of the occurrence of yellow fever in the Malakal region during the last 5 years. O'BRIEN (p. 21) reports 81 cases from the Gold Coast, and SOREL (p. 21) records a distinct increase in the number of cases found in 1937 in French W. Africa ; 48 were reported.

SOPER (p. 633) shows that rural yellow fever (transmitted by *Aëdes aegypti*) and jungle yellow fever (transmitted in the absence of *Aëdes aegypti*) are responsible for maintaining non-urban endemicity in S. America, with the result that anti-Aëdes measures in seed beds of infection failed to eradicate the disease from Brazil.

Protection tests.—In the *Bulletin de l'Office International d'Hygiène Publique* (p. 23) it is pointed out that the only real value of the mouse protection test is for making a retrospective diagnosis in a community suffering from an epidemic of uncertain nature, when the number of positives is well above that of the surrounding population.

The test is recognized as specific by the great majority of workers (DINGER, p. 23), but BOYÉ (p. 25) disputed its value in a discussion in connexion with the patients from the "Sea Rambler." CLERC and STEFANOPOULO, however, did not agree with Boyé. SCHÜFFNER (p. 634) agrees that the mouse protection test is specific, and uses a 10 per cent. (instead of 20 per cent.) suspension of virus for the detection of small quantities of immune bodies. VAN DEN BERGHE (p. 641) uses a 20 per cent. suspension, and dilutes the serum 1 : 7. He describes

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin*, 1939, Vol. 36. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

the technique adopted for the test on batches of mice. PELTIER (p. 650), discussing the specificity of the test, points out that of 117 sera from natives in Dakar born before the epidemic of 1927, 71 were positive, whereas of 100 born after the epidemic, none was positive.

CROUCH (p. 21) reports that 12 of 27 sera from the Nubian Mountains gave positive protection tests. In Ruanda-Urundi, VAN DEN BERGHE (p. 634) found no positive protection tests, but VAN CAMPENHOUT (p. 23) found one positive in 50 tested.

In the report of the INSTITUT PASTEUR OF BRAZZAVILLE (p. 632) it is shown that sero-protection tests were given by the blood of 5 cattle in the Tchad region, and one monkey of 11 tested in the Congo gave a positive test (VAN DEN BERGHE, p. 634).

In spite of the fact that no epidemic of yellow fever has been reported in Paramaribo, Surinam, since 1908, SCHÜFFNER *et al.* (p. 22) found positive protection tests in 25 of 233 sera of those living there since 1908 (but not before). This is therefore not easy to explain, but may be due to small epidemics. In 60 who lived there before 1908, 34 were positive. These authors found no positives in 95 inhabitants of the Netherlands, but 4 of 6 persons in Amsterdam who were in daily contact with the virus gave positive tests.

DA FONSECA and ARTIGAS (p. 652) have investigated the susceptibility of a large number of wild animals in Brazil. For details the original abstract should be consulted. The same authors (p. 653) found young cats to be susceptible, and DA FONSECA (p. 653) shows that a small rodent, *Ctenomys brasiliensis*, is highly susceptible to neurotropic virus.

Jungle yellow fever.—SOPER (p. 631) thinks that the 250 deaths which took place in Brazil during the first part of 1938 indicate at least 15,000 cases of yellow fever ; all the cases in S. America in that year were of the jungle type transmitted in the absence of *Aëdes aegypti*. He (p. 633) details the countries in which it is found, and states that in S. Brazil it occurs as a wave-like phenomenon. BAUER (p. 20) finds that jungle yellow fever may give rise to well marked epidemics, but the mode of transmission is still obscure. SOPER (p. 21) confirms the importance of jungle yellow fever in S. America. It is widely distributed and is associated with increased mortality among howler monkeys, and protection tests on numerous wild animals support the view that monkeys constitute the most important factor in spread. Viscerotomy is invaluable in discovering cases.

SCHÜFFNER *et al.* (p. 25) found that 16 per cent. of a group of Indians and bush negroes in Surinam, among whom no epidemic of yellow fever had occurred, showed immunity which is attributed to the jungle form. Jungle yellow fever is an epizootic capable of transmission to man.

FINDLAY (p. 633) shows that in Africa, as in S. America, immunity is found in 20–25 per cent. of wild monkeys in endemic areas, but in Africa only the Barbary ape (living in a non-endemic northern area) reacts to infection with well marked clinical symptoms, whereas in S. America some species are very susceptible. True jungle fever has not yet been found in Africa.

Aetiology.

FINDLAY and MACCALLUM (p. 635) record spontaneous variation in a neurotropic strain which, between the 670 and 750 passages in mouse brains, before which it had regularly produced neurotropic symptoms

in monkeys, began to produce death with the characteristics of the pantropic strain. HINDLE emphasizes the extreme importance of this finding and of the regular testing of the pathogenicity of strains used for human immunization. SCHÜFFNER *et al.* (p. 636) show that substrains of the Dakar strain maintained since 1928 alternately in *M. rhesus* and dried *in vacuo*, and also by continued subinoculation in mice, have remained true to type. Dried virus kept in sealed tubes from which the air had been removed was fully virulent after 5 years.

DE ASSUMPÇÃO (p. 33), by means of protection tests, has demonstrated the essential identity of a São Paulo jungle strain and a neurotropic strain from Dakar. Similarly, at the Institut Pasteur at Brazzaville (p. 632) the identity of the "Brazza" and the Dakar strains has been established.

Neurotropic virus of the Asibi strain was found by DA FONSECA (p. 636) to persist in the testes of guineapigs inoculated by that route for periods up to 43 days.

HÖRING (p. 636) has established the fact that yellow fever virus is inactivated by exposure to solutions of urea. This effect depends on the concentration of urea, the dilution of the virus and the duration of contact. In human blood, although the amount of urea is not more than 30–40 mgm. per 100 cc. in febrile cases, this action cannot entirely be denied since the urea is in contact with the virus for considerable periods.

SALEUN *et al.* (p. 32) have isolated a strain of yellow fever virus in French Equatorial Africa, for the first time, thus furnishing conclusive evidence of the existence of the disease in that region.

NICOLAU (p. 635) regards the virus of yellow fever as a small visible coccus, giving his reasons, but HINDLE points out that the author ignores the fact that filtration experiments have shown the size of the virus to lie between 18 and 27$\mu\mu$, approximately one-tenth of the limit of resolution of the visual microscope.

Transmission.

SALEUN (p. 632) in French Equatorial Africa points out that it is necessary to abandon the old view that the cycle of infection is man-Aëdes-man; that there is probably an animal reservoir; and that there is probably some other insect vector, though when the disease is once established in man *Aëdes aegypti* appears to be responsible for the development of typical epidemics. FINDLAY and MACCALLUM (p. 638) suggest that other arthropods may play a part in transmission in seasons when mosquitoes are rare. Monkeys may be infected by introducing material into the stomach; in the abdomen of the cockroach, *Blattella germanica*, the virus may remain active for 15 days at 19°C.; monkeys eat these cockroaches. It would be interesting to determine what animal foods monkeys use in nature in yellow fever areas.

PATIÑO CAMARGO (p. 25) names 5 vectors by bite in Colombia:—*Aëdes aegypti*, *Aëdes scapularis*, *Aëdes taeniorhynchus*, *Aëdes fluviatilis* and *Culex fatigans* (occasionally). Others are infective if triturated and injected. BENNETT *et al.* (p. 639) have proved that *Aëdes triseriatus*, a neoarctic mosquito ranging throughout the Eastern U.S.A., is an efficient vector, but there is some evidence of attenuation of the virus in it.

SHANNON *et al.* (p. 27) have proved that in nature *Aëdes leucocelaenus* and *Haemagogus capricorni* are vectors by bite of jungle

yellow fever in Brazil. Injection of an emulsion of the latter and also of Sabethine mosquitoes also produced infection.

KUMM and NOVIS (p. 28) studied the habits of the mosquitoes found in a jungle yellow fever area in which *Aëdes aegypti* was not found.

Although *Aëdes geniculatus* kept at 30–35°C. is capable of transmitting yellow fever by bite, ROUBAUD *et al.* (p. 638) failed to effect transmission when the mosquitoes were kept at 20–22°C., though the virus survived in their bodies.

SHANNON (p. 639) gives advice on methods for collecting and feeding mosquitoes in jungle yellow fever studies.

Pathology and Clinical Findings.

SCHÜFFNER *et al.* (p. 25) in Surinam found no distinction between jungle and classical yellow fever in respect of pathological anatomy and serology.

LLOYD (p. 31) points out that histological diagnosis of viscerotomy specimens requires careful attention by a skilled observer, and inclines to the opinion that a diagnosis on this evidence alone should not be accepted as final. All outbreaks should be checked by blood surveys. DA ROCHA LIMA (p. 29) emphasizes that histological diagnosis should not be made on any single character alone, such as hyaline necrosis, but on a careful consideration of the evidence produced by a number of changes in the cells.

MONTENEGRO (p. 641) defines the Councilman-Rocha-Lima cell. It shows coagulative necrosis with a well marked edge surrounded by a narrow clear halo ; the cytoplasm is eosinophilic, non-granular, more refractile than normal and contains small vacuoles ; the nucleus is reduced in size and is homogeneous, staining a deeper red than the cytoplasm ; the cell is rarely binucleate. He describes other cells which may resemble this cell.

TIBIRIÇÁ (p. 29) discusses the jaundice of yellow fever. At first it is haematogenous ; later, when the cells are damaged, it is hepatogenous or a mixture of the two.

STEVENSON (p. 640), examining the brain and spinal cord of patients dead of yellow fever, found the principal lesion to be perivascular haemorrhage. Nerve cell changes were slight and there was no evidence of neurotropism in this series.

SCHÜFFNER *et al.* (p. 25) though unable to distinguish between the pathological changes in jungle and classical yellow fever in Surinam, state that clinically jungle fever is milder. It is not a serious disease and may easily be overlooked. It is probably responsible for the immunity found in the younger people of Paramaribo, where no epidemic of the classical disease has been recorded recently. Jungle fever is an epizootic capable of transmission to man in whom it may be a slight or masked infection.

VAN CAMPENHOUT (p. 22) describes the clinical features of an epidemic of what might have been yellow fever at Zongo in the Congo. Proof of the identity of the disease was not found but precautionary measures were taken. JADIN and ARNALDI (p. 642) discuss this outbreak and point out that the application of anti-mosquito measures and anti-yellow fever vaccination was followed by disappearance of the epidemic, and they therefore consider it to have been atypical yellow fever.

Vaccination.

With regard to the duration of immunity after yellow fever vaccination it is the view of the Yellow Fever Commission (p. 648) that a definite opinion cannot yet be given. PELTIER (p. 650) has investigated the persistence of protective bodies after vaccination with phosphate and egg-coated vaccines over a period up to 4 years and concludes that it may be advisable to revaccinate every two years. SOREL (p. 21) recommends the testing of the blood one month after vaccination to determine the degree of immunity acquired, and one year later to test its persistence. The Yellow Fever Commission (p. 23) makes a similar suggestion.

JAMES (p. 20) reports on immunization with a single inoculation of neurotropic virus attenuated by culture, suspended in 0·25 to 0·5 cc. homologous serum. SAWYER in Brazil has reported on 80,000 persons thus vaccinated, without the occurrence of any complications, and FINDLAY on 4,300 in London before proceeding to yellow fever countries, none of whom contracted the disease although 34 non-vaccinated Europeans in the same areas became infected. BAUER (p. 20) shows that reactions took place in 10 per cent. of 200,000 persons vaccinated in Brazil by this method, but no jaundice or deaths occurred. Immune bodies were present in 95 per cent. after one month and had not diminished a year later.

Of the 4,300 persons vaccinated by FINDLAY (p. 20), 2·9 per cent. contracted jaundice, probably through the presence of a virus in the serum used. The use of a new strain of culture virus in 1,100 vaccinations has not resulted in any cases of jaundice. FINDLAY and MACCALLUM (p. 30) discuss the 89 cases of jaundice which occurred in 3,100 persons vaccinated with virus in immune serum. The average period before development of jaundice was 2 to 3 months. They suggest as the cause either a hepatotoxic virus introduced with the virus inoculum or a combination of a hepatotoxic substance in the serum and an infective agent which is probably that of common infective hepatic jaundice. In further discussion of this subject FINDLAY *et al.* (p. 651) advise that pools of apparently normal human serum should not be used for human inoculation unless the medical history of all donors can be followed for at least one month.

SMITH *et al.* (p. 648) give an account of virus 17D (originally from the virulent Asibi strain), which is now maintained in tissue culture of fowl embryo from which the brain and spinal cord have been removed to obviate neurotropism. In addition to tests for sterility each batch is tested for any enhanced or viscerotropic properties, or neurotropism. Rehydrated vaccine is used and the quantity of virus varies between 500 and 11,000 m.l.d. for mice. Circulating virus may be found in the blood from the 4th to the 10th day, antibodies are formed within 28 days and are usually present for a year. Reactions are mild.

SOPER (p. 20) reports on the use of pantropic virus 17D cultivated on fowl embryo tissue. Slight reactions may be seen and small quantities of virus may be found in the blood between the 4th and 10th days. Complete protection was found in 42 of 45 persons studied after inoculation. For inoculation the tissue culture strain is inoculated into fowl embryos within the egg shell; these are incubated for some days and the embryos are then ground in normal human serum to make a 10 per cent. suspension, dried and stored in ampoules. The virus must be alive at the time of vaccination, and the dried virus should

therefore be tested. A similar recommendation is made by the Yellow Fever Commission of the Office International d'Hygiène Publique (p. 23). This method gives a higher concentration than is obtained in the tissue cultures.

JAMES (p. 632) reports on almost one million vaccinations with virus 17D. Reactions are slight and protection is afforded to at least 95 per cent. of those vaccinated. In London 3,500 have been immunized with this virus without the occurrence of any jaundice.

Repeated experiments have convinced PELTIER *et al.* (p. 637) that the use of neurotropic virus for vaccination does not involve any risk of infection of the general population even where Aëdes is common. WHITMAN (p. 637), as a result of tests on man and monkeys, finds that there is little if any danger of the transmission of virus 17D by *Aëdes aegypti*, although the virus was present in the blood at the time of biting. The Yellow Fever Commission of the Office International d'Hygiène Publique (p. 23) point out that although a virus not attenuated by prolonged culture may appear in the blood and be transmitted by *Aëdes aegypti*, a cultured virus such as 17D has a very attenuated virulence, and attempts to transmit it by mosquito have failed. Mass vaccination may be the only practical measure of prophylaxis in a jungle population. JAMES (p. 632) agrees with this view.

SOPER (p. 633) suggests that the populations of the larger towns of West Africa, which are potentially dangerous centres for spread of infection, should be immunized.

The vaccine strain prepared by the Rockefeller Institute is the Asibi strain attenuated by prolonged cultivation in media containing fowl embryo tissue. DONOVAN (p. 650) reports that reactions may occur after a week, but are slight.

VAN CAMPENHOUT (p. 22) reports severe reactions in 13 of 30 Europeans vaccinated with Laigret's vaccine [a suspension of infected mouse brain mixed with egg yolk, see this *Bulletin*, 1935, Vol. 32, p. 880]. In natives reactions were generally much less severe.

ARAGÃO (p. 26) reports that over 8,000 vaccinations were performed in the State of São Paulo during a small epidemic. There were no serious reactions and the outbreak ceased.

Control.

In Brazil, SOPER (p. 633) shows that control is based on viscerotomy, anti-*Aëdes aegypti* measures and vaccination. DINGER (p. 23) considers that the only feasible preventive measure in the Dutch East Indies at present is a survey of Aëdes breeding places, since the introduction of virus for vaccination and for mouse protection tests is prohibited by law.

In America (p. 646) there is now a rule that persons flying from potential or actual foci of yellow fever must be kept under surveillance for 6 days. Persons vaccinated or otherwise immune are exempted.

Park ROSS (p. 643), MACKIE and CRABTREE (p. 32) and the *Lancet* (p. 31) describe the Larmuth spray unit (operated by CO_2 from a sparklet bulb) and the Phantomyst electrically driven nebulizer, for use in spraying insecticide solutions in aircraft in flight. Deskito, an aqueous base extract of pyrethrum, non-inflammable, non-staining, non-corrosive and not objectionable, is used with very satisfactory results, but Aircraft Pyagra is quicker, more reliable and gave 100 per cent. kill on trial.

Park Ross (p. 643) details the procedures taken to disinsectize seaplanes arriving at Durban. This should be done by skilled persons and can be effected within 10 minutes. CUMMING (p. 647) gives a detailed list of possible mosquito harbourages on aircraft, which cannot be further abstracted. *C. Wilcocks.*

YELLOW FEVER.

PRÉCIS OF ABSTRACTS IN THIS SECTION.

JAMES (p. 88) summarizes the world notifications for the 6 months ending 31st March, 1939. Infected localities and deaths are fewer, but jungle fever remains a serious problem in S. America. Vaccination and revaccination with virus 17D are continued without the development of delayed jaundice. SOREL (p. 89) reports on the French African colonies and states that it is becoming more and more evident that vaccination affords a sure method of prevention.

BABLET (p. 89) discusses the viscerotomy findings in the French colonies, in which 44 per cent. of the specimens examined were positive. Although in healthy persons the usual medicinal doses of carbon tetrachloride are not likely to produce lesions resembling those of yellow fever, in diseased livers this may not be so.

O'BRIEN (p. 90) reports 15 fatal cases from the Gold Coast.

The Yellow Fever Commission (p. 90) records an increase in positive protection tests in Malakal where clinical yellow fever is unknown and *Aëdes aegypti* is practically non-existent. Vaccination with virus 17D is recommended and the importance of viscerotomy stressed.

SNEATH (p. 90) records evidence which leads to the opinion that the yellow fever of British Guiana is of the jungle variety. If this were allowed to encroach on the coastal belt conditions there would favour its spread.

RUSSELL (p. 91) reviews the question of the possible introduction of yellow fever into India.

The value of vaccination by 3 injections of phosphate vaccine or one of egg-coated vaccine is demonstrated by VOGEL and RIOU (p. 91). PELTIER *et al.* (p. 92) have shown that neurotropic virus can pass through the scarified skin and is capable of giving rise to positive protection tests when mixed with smallpox vaccine and applied in the usual way. They propose to apply this method on a large scale in natives.

FINDLAY and MACCALLUM (p. 93) have infected monkeys by introducing virus into their stomachs through a catheter, but with other animals the method failed. Human volunteers who swallowed virus 17D showed no subsequent immune bodies, probably owing to the destructive action of the gastric juice. The same authors (p. 93) report on spontaneous development of yellow fever in two laboratory monkeys and although the method of infection is not known it may have been through the agency of cockroaches, ants or other arthropods.

A baboon inoculated intracerebrally with a neurotropic strain by VAN DEN BERGHE (p. 94) showed liver changes and virus recovered

from the liver showed viscerotropic qualities although that recovered from the brain remained neurotropic.

In the opinion of POWERS and HEADLEE (p. 94) the lethal effect of petroleum oil on eggs of *Aëdes aegypti* is due to a coating of oil on the chorion which causes oxygen starvation. The authors have tested 28 oils and name the most efficient. IMBASCIATI (p. 95) discusses preventive measures in relation to aircraft serving Africa. *C. W.*

i. JAMES (S. P.). Renseignements concernant la fièvre jaune reçus au cours des six mois se terminant le 31 mars 1939. [**Information on Yellow Fever received during the Period of Six Months ending March 31st, 1939.**]—*Bull. Office Internat. d'Hyg. Publique.* 1939. June. Vol. 31. No. 6. pp. 1044–1047.

ii. SOREL (F. P. J.). Les cas de fièvre jaune dans les Colonies Françaises d'Afrique en 1938. [**Cases of Yellow Fever in French African Colonies in 1938.**]—*Ibid.* pp. 1048–1052.

iii. BABLET (Jean). Contrôle histologique de la fièvre jaune dans les Colonies Françaises au cours des années 1937 et 1938. [**The Histological Control of Yellow Fever in French Colonies during 1937 and 1938.**]—*Ibid.* pp. 1053–1059.

iv. O'BRIEN (A. J. R.). La fièvre jaune en Gold Coast et en Nigéria pendant l'année 1938. [**Yellow Fever in the Gold Coast and Nigeria during 1938.**]—*Ibid.* pp. 1060–1062.

v. VAN CAMPENHOUT (J.). Modifications à la technique du test intrapéritonéal de protection antiamarile de la souris. [**Modifications in the Technique of the Intraperitoneal Yellow Fever Protection Test in Mice.**]—*Ibid.* pp. 1063–1064.

vi. BULLETIN DE L'OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE. 1939. June. Vol. 31. No. 6. pp. 1065–1067.—Rapport de la commission de la fièvre jaune. [**Report of the Yellow Fever Commission.**]

i. Cases of yellow fever notified during this period are indicated in the following table :—

South America.

Country	State or District	No. of localities with cases	No. of cases	No. of deaths
Brazil	Rio de Janeiro	2	—	2
	Espirito Santo	12	—	44
	Minas Geraes ...	3	—	8
Africa.				
Belgian Congo	... ...	1	1	—
French Equatorial Africa	Upper Sangha	1	1	1
	Tchad	1	1	1
French West Africa ...	Ivory Coast ...	10	15	8
	Niger	1	1	—
	Sudan	3	3	2
British West Africa ...	Ivory Coast ...	3	3	3
	Nigeria ...	7	9	5

Comparing the period in question with the similar period last year there has been a fall in the number of infected localities from 97 to 44, and in the number of deaths from 190 to 74. No more urban cases have been recorded from South America, but jungle yellow fever remains a serious problem.

Vaccination seems the only practical method of protection at present and in 1938 the number vaccinated (with virus vaccine 17D) was 1,059,292.

In London 7,000 have now been vaccinated before proceeding overseas, 3,000 with culture virus 17D, and no cases of delayed jaundice have been observed in the latter. Antibodies have been found to persist in many cases 4 to 7 years after vaccination, but in 40 per cent. of the cases antibodies disappeared within 2 years. Re-vaccination has been applied in 200 cases without any reaction being observed.

ii. During 1938 the number of recorded cases of yellow fever was only 24, as compared with 48 in 1937. There were 18 cases with 16 deaths among Europeans, 4 cases among Syrians, and 2 natives. Details are given of epidemiology of the various cases, all of which presented typical symptoms. One of the two deaths recorded from French Equatorial Africa occurred in a camp of the Mining Company of Eastern Oubangui at Sasso, and was a case of rural yellow fever. No connexion with any other cases could be established. The results of serum protection tests on 24 inhabitants of Gabon were all negative except in one very doubtful case in which there were febrile symptoms suggestive of yellow fever. Ten sera from Birao, on the Anglo-Egyptian Sudanese frontier, gave 7 positive and 1 doubtful. None of these yellow fever patients had been vaccinated. As time goes on it is becoming more and more evident that vaccination affords a sure method of protection.

iii. The results of the histological examination of 142 specimens of liver obtained by viscerotomy in French Colonies during 1937 and 1938 are indicated in the following table :—

Country of Origin	No. examined	Positive	Negative
Antilles (Martinique, Guadeloupe) ...	4	0	4
French West Africa	104	54	50
Senegal	50	28	22
Ivory Coast	24	14	10
Sudan	16	10	6
Dahomey	7	2	5
Guinea	6	0	6
Mauritanea	1	0	1
French Equatorial Africa	34	9	25
Cameroons	10	1	9
Gabon	12	4	8
Middle Congo	6	2	4
Oubangui-Chari-Tchad	6	2	4

The proportion of positive cases is thus 44 per cent. as compared with 24 per cent. of the specimens examined in 1935–1936. Seven of the cases included children, 4 below 10 years of age, all of whom showed typical hepatic lesions. One patient who had been vaccinated

against the disease 2 years previously died with symptoms suggestive of yellow fever, but the histological examination showed none of the typical changes. A month later his wife died of yellow fever with typical histological changes, but the author considers that it is unjustifiable to assume that the two were connected in any way.

Various examples are given of the use of this method of diagnosis for checking the results of clinical observations, including cases showing fatty degeneration of the liver cells but without the typical necrosis.

Experimentally the author finds that there is little likelihood that a medicinal dose of carbon tetrachloride, even if repeated or doubled, is capable of producing in healthy subjects hepatic lesions identical with those of yellow fever [see also this *Bulletin*, 1939, Vol. 36, p. 831]. But in the colonies the natives are rarely free from some other infection. Diseased organs are not able to withstand the action of toxic agents in the same way as healthy ones and may develop lesions resembling those of yellow fever except that pyknotic nuclei are present. The most difficult cases to diagnose are those with recent cellular lesions superimposed on a condition of chronic hepatitis.

iv. During 1938 in the Gold Coast there were 15 cases of yellow fever, all fatal, as compared with 75 in the previous year. Four out the five European cases were engaged in road work, which shows the risk of living in rest camps or similar places where mosquito control is impracticable.

Details are given in tabular form of the various cases occurring in Gold Coast and Nigeria in the period in question.

v. See this *Bulletin*, 1939, Vol. 36, p. 641.

vi. The Commission considered five special questions. In Malakal the proportion of natives whose blood gives positive protection tests has risen from 0 to 18 per cent. in 4 years (Atkey). Yet in this period there has not been a single clinical case of yellow fever, and *Aëdes aegypti* is practically non-existent. The Commission await the results of further tests in this and adjoining territories.

It is considered that the use of virus vaccine (17 D) can be recommended for mass vaccination as the amount of virus circulating in the blood is too small to infect mosquitoes feeding on vaccinated subjects. The great value of prophylactic vaccination has been confirmed on a large scale in many districts. Viscerotomy for the diagnosis of cases of yellow fever is indispensable both in endemic and silent zones.

With regard to epidemiology, in the Belgian Congo a monkey, *Colobus polykomos*, caught at Niangala, gave a positive protection test in a region where the sera of a considerable proportion of the natives also contained yellow fever antibodies. [See also this *Bulletin*, 1939, Vol. 36, p. 634.]

An index of the prevalence of *Aëdes aegypti* in the various African countries, has now been prepared and will be of great practical value, especially from the point of view of quarantine regulations. Its periodic publication is recommended. *E. Hindle.*

SNEATH (P. A. T.). **Yellow Fever in British Guiana.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. July 28. Vol. 33. No. 2. pp. 241–252. With 1 map.

An interesting account of the yellow fever problem in British Guiana where, in spite of the fact that only one case of the disease

(in 1909) has been recorded during the past 48 years, there is a widespread immunity against yellow fever in the interior.

In 1934 by mouse protection tests an examination was made of the blood of 169 persons from four coastal communities. 122 under 15 years old were all negative, whilst only 4 out of the remaining 47 were immune. This would seem to justify the conclusion that the inhabitants of the coast have not been exposed to infection for at least 15 years.

In March 1938, a commission studied the Rupununi District and, out of 46 sera collected, 6 gave positive protection tests, although *Aëdes aegypti* was never found.

Subsequently, by the help of travellers, 289 additional blood samples have been obtained, mainly from aboriginal Indians, in nine principal localities, of which Rupununi furnishes two. Out of 246 males, 118, or 47·9 per cent., were immune, whilst out of 43 females only 8 were immune.

The extent of exposure is thus not common to both sexes and this fact together with the epidemiology, suggests that the disease involved is the jungle variant of yellow fever. The major foci of infection may be the forested regions of northern and central Rupununi, but there is reason to believe that sources of infection are more widespread. Special precautionary measures are necessary to prevent the introduction of the jungle virus into the vulnerable coastal belt, where conditions would favour its spread.

In a postscript the author records the results of the examination of 6 males and 8 females from the Essequibo river. Of the males 5 were immune, the youngest only 3 years old ; of the females 6 were immune, the youngest 5 and 6 years of age. *E. H.*

RUSSELL (Alexander J. H.). **A Note on the Yellow Fever Position.**—*Jl. Malaria Inst. of India.* 1939. June. Vol. 2. No. 2. pp. 115–120.

A general review of the present position of yellow fever with special reference to India and the Far East. It is pointed out that the African endemic and " silent " areas must be looked upon with equal suspicion and an account is given of the quarantine measures to ensure against the introduction of infected mosquitoes by aeroplanes. Karachi is the airport of entry in India for all air traffic coming from the west, and the aerodrome there has now been made " anti-amaryl." Provision has also been made for the segregation of suspected or infected persons arriving by air in a mosquito-proofed isolation hospital.

It is pointed out that the Government of India is alive to the danger of the introduction of yellow fever and every possible step is being taken to ensure the avoidance of such a catastrophe. *E. H.*

VOGEL (E.) & RIOU (M.). Les maladies épidémiques, endémiques et sociales dans les colonies françaises pendant l'année 1937. Fièvre jaune. [**The Epidemic, Endemic and Social Diseases in French Colonies during 1937. Yellow Fever.**]—*Ann. de Méd. et de Pharm. Colon.* 1939. Apr. Vol. 37. Supplement. pp. 286–301.

A summary of the number of cases of yellow fever occurring in French African colonies during 1937 ; 41 cases with 37 deaths in French West Africa and 7 cases, all fatal, in Equatorial Africa.

Observations are given concerning the methods of vaccination by the use of 3 injections of phosphate vaccine or a single injection of egg coated vaccine. [See this *Bulletin*, 1935, Vol. 32, p. 880.] The results of sero-protection tests on vaccinated persons show that in 85 to 90 per cent. immunity develops between the second and third inoculations. In some cases immunity tends to disappear by the end of a year, but in more than 75 per cent. is still present, and even after two years this percentage hardly diminishes. In French colonies 10,412 persons were vaccinated between 1934 and 1937 inclusive, with only one case of yellow fever occurring amongst them, whilst during this period 109 fatal cases of yellow fever occurred in the non-vaccinated. The single vaccinated persons who became infected had been vaccinated more than two years previously. The method, although occasionally followed by violent reactions, is said to have never provoked a fatal reaction or any permanent disability. *E. H.*

VAN DEN BERGHE (Louis). Recherche de l'immunité amarile dans le sérum de pygmées Efé de l'Ituri (Congo belge). [**A Study of Yellow Fever Immunity in the Serum of Efé Pygmies from the Ituri (Belgian Congo).**]—*Ann. Soc. Belge de Méd. Trop.* 1939. June 30. Vol. 19. No. 2. pp. 241–242.

The author has examined the sera of 26 pygmies, all more than 50 years old, belonging to the Efé tribe from the Ituri Forest in the neighbourhood of Beni. All the sera were negative for yellow fever immune bodies. *E. H.*

PELTIER (M.), DURIEUX (C.), JONCHÈRE (H.) & ARQUIÉ (E.). Pénétration du virus amaril neurotrope par voie cutanée. Vaccination mixte contre la fièvre jaune et la variole. (Note préliminaire.) [**The Percutaneous Penetration of Neurotropic Yellow Fever Virus. Mixed Vaccination against Yellow Fever and Smallpox. Preliminary Note.**]—*Bull. Acad. Méd.* 1939. May 9. 103rd Year. 3rd Ser. Vol. 121. No. 17. pp. 657–660.

The authors tested the capacity of a neurotropic strain of yellow fever virus (French strain at its 238th passage) to pass through the skin.

The vaccine was first tested by being applied to the scarified abdomen of 2 rhesus monkeys. They both showed virus in the blood from the 4th to 8th days inclusive and 30 days later their sera were strongly positive, although no febrile symptoms ever developed.

Six human volunteers, 4 white and 2 negro, were similarly infected by applying the filtrate of a suspension of infected mouse brain. In 5 of them virus appeared in the blood, and all developed antibodies against yellow fever.

The authors then proceeded to test a mixture of neurotopic yellow fever virus with smallpox vaccine, to see whether vaccination against both diseases could be performed simultaneously. This was successful in 4 rhesus monkeys and subsequently was tried on 741 human subjects without any accident. The blood of 386 out of 500 of these patients gave negative protection tests against yellow fever before vaccination, whilst 266 out of 295 tested 6 weeks later were positive.

The authors consider, therefore, that this is a practicable method for the vaccination of native populations in Africa and its application to 100,000 natives is being authorized. *E. H.*

FINDLAY (G. M.) & MACCALLUM (F. O.). **The Transmission of Yellow Fever Virus to Monkeys by Mouth.**—*Jl. Path. & Bact.* 1939. July. Vol. 49. No. 1. pp. 53–61. With 3 charts.

A record of experiments showing that yellow fever virus can infect the Indian *rhesus* monkey and the African guenon, *Cercopithecus aethiops*, when material containing the virus is administered by means of a catheter passed into the stomach.

Five strains were employed, the pantropic French, Asibi and Gold Coast viruses, neurotropic mouse brain passage virus, and the attenuated tissue culture virus 17 D, such as is used for human immunization. The material to be administered was made up to 1 cc. in a 1 cc. syringe, connected to a fine flexible catheter which was passed down the monkey's oesophagus and the contents of the syringe injected into the stomach.

Using this method 27 rhesus monkeys were exposed to infection with the above 5 strains and all became infected, some dying of yellow fever and others becoming immune.

Only 4 *Cercopithecus aethiops* were available, but all became immune after the administration of either pantropic Asibi (1) or French strain virus (3). Virus was present in the peripheral blood for 3 to 5 days after incubation periods of 3 to 5 days.

Attempts to infect 2 dogs, 2 rabbits, 2 guineapigs, 4 rats, 12 mice, 2 hens and 4 pigeons by this method gave negative results. The attenuated tissue culture virus was also given in gelatine ampoules to 6 human volunteers whose blood showed no immunity to yellow fever. The results were negative, as serum from these volunteers tested after 3 and 6 weeks showed no immune bodies. This failure to produce immunity in man seems to be correlated with the rapid destruction of yellow fever virus by the acid gastric juice, as shown by *in vitro* experiments by Dr. MARTIN at the London Hospital for Tropical Diseases. [See also this *Bulletin*, 1939, Vol. 36, p. 638.] *E. H.*

FINDLAY (G. M.) & MACCALLUM (F. O.). **Spontaneous Yellow Fever in Rhesus Monkeys in the Absence of Mosquitoes.** [Correspondence.] —*Nature.* 1939. Aug. 19. Vol. 144. No. 3642. p. 332.

The danger of laboratory infection with yellow fever before the development of satisfactory immunization is well shown by the fact that 37 cases among laboratory workers have been reported, but in every instance those contracting the disease had been in close contact with infective material.

Last winter 2 rhesus monkeys kept under laboratory conditions at an interval of 71 days developed and died from spontaneous yellow fever. The monkeys were in two separate animal houses. In the case of the first animal no other monkeys infected with yellow fever had been in the same room for more than 3 months, while the second animal was in a room where there had been no other infected monkeys for nearly 6 months. No virulent pantropic virus was in use in the laboratory during the period.

The method of infection is at present unknown, but human agency can be ruled out, since the stock of virulent yellow fever virus is under strict control. Mosquitoes were entirely absent, but monkey lice and rat fleas were found. In addition cockroaches, *Blattella germanica*, and a small ant, *Monomorium pharaonis*, were present.

The possibility of any of these arthropods being responsible for the spontaneous infection of the monkeys is at present under investigation. [See also this *Bulletin*, 1939, Vol. 36, p. 638.] *E. H.*

VAN DEN BERGHE (Louis). Mutation et dédoublement du tropisme par inoculation intracérébrale de virus amaril neurotrope à un singe cynocéphale. [**Mutation and Dissociation of the Neurotropism, by the Intracerebral Inoculation of Neurotropic Yellow Fever Virus into a Baboon.**]—*C. R. Soc. Biol.* 1939. Vol. 131. No. 15. pp. 153–156.

A baboon, *Papio jubilaeus*, was inoculated intracerebrally with a suspension of the brain of a mouse infected with neurotropic yellow fever virus belonging to the French strain at the 322nd passage. After 7 days it succumbed to the infection and at autopsy its liver was found to contain acidophilic intranuclear bodies. The subcutaneous inoculation of this liver tissue into a rhesus monkey produced a typical viscerotropic infection with death on the 4th day, and passage in a second rhesus monkey resulted in an infection fatal on the 11th day.

Mice were inoculated intracerebrally with emulsions of the brain of the baboon, or of the livers of the two rhesus monkeys. In the case of the former the mice died of encephalitis on the 5th and 6th day, but those inoculated with the virus from the rhesus monkeys died between the 6th and 12th day, the usual interval when mice are inoculated with viscerotropic virus.

It would seem, therefore, that the baboon is a favourable host for the recovery of the virus and also that the properties of the virus are curiously dissociated in this animal, being strongly neurotropic in the brain and viscerotropic in the liver. *E. H.*

POWERS (George E.) & HEADLEE (Thomas J.). **How Petroleum Oil kills Certain Mosquito Eggs.**—*Jl. Econom. Entom.* 1939. Apr. Vol. 32. No. 2. pp. 219–222. With 2 figs.

A record of experiments on the effect of different kinds of petroleum oil on the eggs of *Aëdes aegypti*.

The lethal effect seems to depend on the establishment of a coating of oil on the chorion, and the more complete this coating the more quickly the egg dies, for the authors show that death is the result of oxygen starvation.

A total of 28 varieties of oil were tested, covering a wide range of physical properties, such as viscosity, flash point, etc., and considerable differences were found in their ovicidal efficiency, based on the ratio between the percentage hatch of treated and untreated eggs respectively. On the whole the most efficient oils were those of about 108 viscosity, and the best results were obtained with "Zerice 40" an oil manufactured by the Standard Oil Company of New Jersey. *E. H.*

HÖRING (Felix O.). Neuere Ergebnisse der Gelbfieberforschung als Beiträge zur Pathogenese der Viruskrankheiten. [**Recent Investigations on Yellow Fever as a Contribution to the Pathogenesis of Virus Diseases.**]—*Klin. Woch.* 1939. July 29. Vol. 18. No. 30. pp. 1013–1017. [50 refs.]

A general summary of recent work on yellow fever with special reference to its significance in the general problem of virus infections. *E. H.*

HÖRING (Felix O.). Gelbfieberbekämpfung in Brasilien. [**The Campaign against Yellow Fever in Brazil.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1939. Aug. Vol. 43. No. 8. pp. 352–368. With 1 fig. [38 refs.]

A general account containing nothing new. *E. H.*

IMBASCIATI (Bruno). La profilassi della febbre gialla per l'aeronavigazione nei paesi caldi. [**Prophylaxis of Yellow Fever in Relation to Aircraft.**]—*Ann. d'Igiene.* 1939. Aug. Vol. 49. No. 8. pp. 542–552. With 1 map.

The first part of this paper is a résumé of modern information on the spread of yellow fever, especially in relation to air travel, which is not new to readers of this *Bulletin*. So far as Italian interests in Africa are concerned, the author concludes that the destruction of mosquitoes in towns and aerodromes is not enough, but that they must be destroyed effectively in the aircraft by a rapid process capable of application by an unspecialized staff during flight. He points out that owing to the size and poverty of Africa the proper care of aerodromes is difficult and those at present existing do not conform to the requirements laid down by the International Air Convention. Aeroplanes coming from suspected places should be subjected to complete search for mosquitoes on arrival. It would be useful to install mechanical means of protection in all aeroplanes serving Africa and it is important to ensure that no undue delay is caused in air traffic.

[Full details of procedure for disinfestation of aircraft are given in this *Bulletin*, 1939, Vol. 36, pp. 643–648.] *C. W.*

DINGER (J. E.). **Yellow Fever.**—*Bull. Colonial Inst. Amsterdam.* 1939. May. Vol. 2. No. 3. pp. 218–230.

HOFFMANN (W. H.). **The Histological Diagnosis of Yellow Fever as an Epidemiological Method.**—Reprinted from *Rev. Med. y Cirug. Habana.* 1938. Vol. 43. No. 3. pp. 155–162.

SENEVET (G.) & ABONNENC (E.). Les moustiques de la Guyane.—IV. Le genre Aedes. [**Mosquitoes of Guiana: Aëdes.**]—*Arch. Inst. Pasteur d'Algérie.* 1939. Sept. Vol. 17. No. 3. pp. 467–480. With 8 figs.

TROPICAL DERMATOLOGY.

A REVIEW OF RECENT ARTICLES. VI.*

Chromoblastomycosis.—Since 1931 CARRIÓN[1] has seen seven cases of this disease in Porto Rico. Six of these exactly resembled the usual Brazilian type but the seventh differed clinically although its histological appearances were indistinguishable from those presented by its fellows and the organism proved to be *Hormodendrum compactum*.

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* For the fifth of this Series see Vol. 36, pp. 99–106.

[1] CARRIÓN (A. L.). Chromoblastomycosis in Puerto Rico.—*Puerto Rico J. Public Health & Trop. Med.* 1938. Sept. Vol. 14. No. 1. pp. 37–71. With 41 figs. on 8 plates. [53 refs.] [Spanish version pp. 72–89.]

In the upper part of the leg the eruption was patchy and polycyclic, whilst the more distal areas were coalescent and bore an extensive central zone covered with scales and crusts. The individual nodules were smooth and pink or grey and warty. The leg was markedly oedematous but there was no actual ulceration. Note is again made of one case which showed metastatic foci, the first in which such had ever been noted [published more fully in the *Puerto Rico Jl. Public Health & Trop. Med.*, 1933, Vol. 9, p. 169]. A full pathological discussion precedes the conclusion that *H. pedrosoi* is the name which designates the species most adequately. This fungus, *H. compactum* and *Phialophora verrucosa* are closely related, a point which the author has stressed in earlier numbers of the same journal [1935, Vol. 11, p. 114 and 1936, Vol. 12, p. 703].

Mycetoma.—The first example of Madura foot to be noted in Porto Rico is presented by CARRASQUILLO[2]. This occurred in a native workman who had spent many years in a coffee plantation as a bare-footed labourer. When he came under observation he was aged forty-eight and stated that the disease had first appeared between the first and second toes some fifteen years earlier. The left foot was practically doubled in size, the hard swelling involving the whole foot and extending three fingers' breadth above the ankle. The skin was dry and scaling, and varied in tint from brown to black. There were many nodules in all stages of development, their sizes ranging between that of a small pea to that of a hazel-nut. Small white grains were present in the pus. Radiography showed rarefaction of all the metatarsals and phalanges. Amputation was performed and cultures revealed a *Cephalosporium* of a species not yet exactly identified. DUNCAN, MARTIN and MURGATROYD[3] report a case from Aden, in an East Indian twenty years of age. The lesion had started some twelve months earlier as a papule on the sole of the right foot. When first seen the whole of the foot was swollen but the obvious nodules were restricted to the sole and to a patch behind and below the internal malleolus. X-rays revealed no bony involvement. The fungus was cultivated by removing a piece of tissue and using Czapek's medium, the acidity of which favoured growth in the material. The primary cultures were all white but the subcultures, which grew better on other media, varied in colour, some being a deep crimson. The organism was undoubtedly *Actinomyces madurae* Vincent.

Piedra.—DANG-VAN-NGU[4] describes a school epidemic of the black variety in Tonking and other cases in Annam. The exact numbers of the cases are not given, but the lesions were all classical in appearance and yielded only *P. hortai* on culture.

Tinea tonsurans.—Specimens obtained from one thousand different juvenile cases in Algeria are the subject of another analysis by CATANEI[5]. The great majority of the infections occurred among

[2] CARRASQUILLO (R. Buso). Madura Foot in Puerto Rico. Case Report.—*Bol. Asoc. Med. de Puerto Rico.* 1938. Dec. Vol. 30. No. 12. pp. 452–455. With 5 figs.

[3] DUNCAN (J. T.), MARTIN (P. H.) & MURGATROYD (F.). Mycetoma pedis caused by *Actinomyces madurae* Vincent. [Demonstration.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. Jan. 28. Vol. 32. No. 4. pp. 427–429.

[4] DANG-VAN-NGU. La piedra noire au Tonkin et en Annam.—*Ann. Parasit. Humaine et Comparée.* 1939. July 1. Vol. 17. No. 4. pp. 359–363. With 6 figs. on 1 plate.

[5] CATANEI (A.). Sur la flore parasitaire des trichophyties en Algérie (d'après la détermination de 1,000 champignons parasites).—*Bull. Soc. Path. Exot.* 1939. Feb. 8. Vol. 32. No. 2. pp. 117–120.

Mohammedans but very few were seen in children living in the hills. In the whole series only twelve cases bore a double infection with two varieties of trichophyta and only seven showed a combination with favus. *T. glabrum* was found on 516 occasions, *T. violaceum* on 406, *T. acuminatum* 20, *T. crateriforme* 17, *T. soudanense* 11. Scattered examples were found of the following varieties, *T. fumatum, pervesi, regulare, cerebriforme, sulfureum, plicatile* and *umbilicatum.* The same author[6] has published another paper of the same nature in which the French colonies and mandated territories are concerned but on this occasion he excludes Algeria and Morocco. The list includes 65 trichophyta, obtained mostly from the Sudan, Cameroons and Pondicherry and 40 microspora from Togo, the Cameroons and Dahomey. *T. soudanense* Joyeux was found 31 times, mostly in specimens from West Africa, *T. violaceum* 20 times, Indo-China being the chief source. Among the remaining specimens there were examples of *T. fumatum, T. sulfureum, T. rubrum* and *T. gourvili* Catanei. Among the small-spored ringworms *M. obesum* was the most common, being present in 21 cultures whilst *M. audouini* was found 14 times. The remainder consisted of *M. ferrugineum* and *M. tardum. M. obesum* Conant is described in very great detail. Microsporon infection of the scalp is rare among the children living in the plains of India, but some of these cases have been examined in detail by MAPLESTONE and DEY[7]. Specimens of hair taken from four boys all revealed *M. audouini,* but those taken from six girls (three from Shillong) and one other boy from Calcutta all yielded cultures which were morphologically indistinguishable from *M. ferrugineum,* although the yellow tinge was absent from the subcultures. Animal experiments proved negative. Of these cases it was possible to see only four personally but these were all between 6 and 9 years of age and the scalp condition was clinically like the ordinary *M. audouini* infection. This particular fungus would appear to be new to India.

Tinea circinata.—Seven cases have been seen in Tonking by CATANEI and GRENIERBOLEY[8], four of them being studied in great detail. Two were caused by *T. rubrum* and two by *T. concentricum.* The latter were classical examples of Tokelau ringworm and it is noteworthy that the concentric rings were reproduced in the experimental animals, guineapigs and monkeys.

Epidermophytosis.—An article by KESTEVEN[9] emanates from Australia and it is natural that the local name of "surfer's foot" should be used. The author agrees that the name is not good, for over half the patients investigated in Sydney were not surf bathers. The disease was found to be present in 38 per cent. of people examined but we are not given exact numbers. Sixteen different fungi were isolated and grown, all the organisms being described very fully.

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[6] CATANEI (A.). Etude des teignes du cuir chevelu dans les colonies françaises.—*Arch. Inst. Pasteur d'Algérie.* 1939. Mar. Vol. 17. No. 1. pp. 47–58. With 4 figs. on 1 plate. [11 refs.]

[7] MAPLESTONE (P. A.) & DEY (N. C.). A Microsporum New to India.—*Indian Med. Gaz.* 1939. Mar. Vol. 74. No. 3. pp. 148–151. With 7 coloured figs. on 1 plate & 3 text figs.

[8] CATANEI (A.) & GRENIERBOLEY (J.). Étude de teignes de la peau observées au Tonkin.—*Arch. Inst. Pasteur d'Algérie.* 1939. June. Vol. 17. No. 2. pp. 282–285. With 3 figs. on 1 plate.

[9] KESTEVEN (H. Leighton). The Mycotic Flora of "Surfers' Foot" in Sydney.—*Med. Jl. Australia.* 1939. Mar. 18. 26th Year. Vol. 1. No. 11. pp. 420–428.

The methods of detection of fungi in scales, and cultural details, are discussed. The author's own descriptions are based on specimens grown at 35°C. on Sabouraud's glucose agar. Nomenclature receives deserved criticism and reference is made to Dodge's "Medical Mycology." The following list is incomplete but indicates the types found and investigated. *E. niveum* McCarthy, *E. pedis* Ota, *E. album* n.sp., *E. flavum* n.sp., *E. cerebriforme* Dodge, *E. macrosporicum*, n.sp., *E. interdigitale* Priestley, *E. planum* n.sp., *Ectotrichophyton mentagraphites* Robin, *Microsporum canis* and various Monilia. He also makes the interesting suggestion that the disease might be spread by infected leather. ZÜNDEL[10] has made thorough studies of 250 patients seen in Berlin. Very full details are given concerning 133 cultures including the methods of control, difficulties encountered, etc. *E. inguinale* was found on 15 occasions, *E. interdigitale* Kaufmann-Wolf 68 times, the remainder comprising specimens of *E. rubrum*, *E. plurizoniforme*, *E. lanoroseum* and *T. pedis* β Ota.

Fungi and Treatment.—Thirteen years' work is reviewed by MU and KUROTCHKIN[11] who have published the results of their observations on ringworm in Peiping. Altogether there were 6,013 clinically suspicious cases, but of these only 2,531 gave positive results on microscopy. The majority of these patients (2,501) were of Chinese stock. Scalp favus was seen on 92 occasions, occurring mostly under the age of 15 years but also seen as late as 30 years of age. All were in members of the poorer classes and cultures always revealed the presence of *A. schoenleinii*. There were 1,104 examples of tinea tonsurans, boys outnumbering girls by 25 to 1, the greatest disproportion found in this series of cases although males greatly outnumber females in all the categories. In all only six cases of kerion were seen and the organisms found were *T. violaceum*, *T. endo-ectothrix*, *M. ferrugineum*, and *T. glabrum*, in that order of frequency. But the most remarkable fact about this group is that 11·8 per cent. of the patients were over the age of sixteen. In Britain of course the disease is practically unknown after that age. No note is made concerning the sexual development of these individuals. Tinea circinata was seen 760 times, *E. rubrum* proving to be the most common fungus. Among 526 cases of epidermophytosis of the extremities and 49 patients with nail infection, the same organism was usually responsible.

Investigations have been carried out by MAPLESTONE and DEY[12] into the therapeutic value of dyes in various fungal infections. Reference is made to Acton's gentian violet treatment of the purulent folliculitis caused by *T. violaceum*, whilst the many dyes that have been used for pyogenic infections also receive notice. The authors have treated many types of fungal disease by their method and claim good results. They have gradually evolved the following formula: 1 per cent. brilliant green, 1 per cent. gentian violet, 10 per cent. alcohol, water to make up to 100 per cent. This lotion is dabbed on freely twice a day after opening pustules and vesicles. Success has

[10] ZÜNDEL (W.). Die europäischen Epidermophytonpilze.—*Arch. f. Dermat. u. Syph.* 1939. May 27. Vol. 179. No. 1. pp. 1–57. With 43 figs. [2 pages of refs.]

[11] MU (J. W.) & KUROTCHKIN (T. J.). Statistical and Mycological Studies of Dermatomycoses observed in Peiping.—*Chinese Med. Jl.* 1939. Mar. Vol. 55. No. 3. pp. 201–219. [12 refs.]

[12] MAPLESTONE (P. A.) & DEY (N. C.). The Use of Dyes in Various Fungal Infections.—*Indian Med. Gaz.* 1939. July. Vol. 74. No. 7. pp. 391–394. With 2 figs. [30 refs.]

been attained in the purulent folliculitis, epidermophytosis of the hands and feet, the intertrigo and "mango toe" forms of *A. keratolytica* infection and in the interdigital and paronychial forms of moniliasis.

Pseudomycosis.—GOHAR[13] has been struck by "the incongruous association, against precedent, of certain species of fungi and lesions, as well as their absence where they are confidently expected." A series of 100 sputa was investigated, 73 of them being obtained from cases which were clinically pulmonary tuberculosis, the remainder representing pneumonias, abscesses, bronchitis and effusion. Some 17 different organisms were isolated, *Aspergillus fumigatus*, *A. niger* and *Syringospora albicans* being the most common. Even these, however, showed no consistency in incidence or type. Among 5 cases of tinea cruris one of them actually grew *Endodermophyton concentricum* although no signs remotely resembling tokelau ringworm were seen. From one case of chromoblastomycosis was grown *Phialophora verrucosa*, but from a second was merely grown the saprophyte *Pullularia pullulans*. *Fusarium solani* was isolated from a gluteal blastomycosis (Ibrahim's disease). In conclusion the author feels that inconsistencies are so marked and Koch's postulates are so rarely fulfilled that a strong case can be made for "pseudomycosis."

Pruritus ani.—Certain indefinite eruptions in the neighbourhood of the anus are often mistakenly termed pruritus ani. CASTELLANI[14] points out that many of these cases are really local fungus infections and that their association with epidermophytosis of the feet is common. There may be indefinite reddish patches, sheets of "dermatitis" which may be smooth and pink, rough and reddened, dry or moist. Later thickening and lichenification ensue, but atrophic and depigmentary changes are rare. Trichophyton-like fungi are nearly always present when such appearances are due to such infection and not to other causes. Of these, *E. floccosum* Harz and *T. rubrum* Castellani are the most common. Very rarely monilial organisms seem to be responsible, *M. pinoyi* and various examples of the Cryptococcus and Torulopsis types have been found. Treatment is dealt with very fully, but the three following ointments receive strongest praise: (1) precipitated sulphur 3–6 per cent., salicylic acid 3–6 per cent. in vaseline; (2) Deek's ointment. Salicylic acid 4 per cent., bismuth subnitrate 10 per cent., mag. salicyl. 4 per cent., ol. eucalypt. 4 per cent., petrolatum 39 per cent. and wool-fat 39 per cent.; (3) phenol 1 per cent., salicyclic acid 3–6 per cent., benzoic acid 3–6 per cent. in vaseline.

Unusual pigmentations.—This subject is discussed by MANSON-BAHR and RANSFORD.[15] Carotinaemia has been seen in Kenya, Nigeria and India and five cases in resident Europeans are described. All the patients had persistently low blood-pressures but the source of

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[13] GOHAR (N.). Mycosis *v.* Pseudomycosis: a Record of Some Fungi isolated in Egypt.—*Jl. Trop. Med. & Hyg.* 1939. Aug. 1. Vol. 42. No. 15. pp. 229–234. [42 refs.] With 1 chart.

[14] CASTELLANI (Aldo). Mycotic Pruritus Ani: a Short General Account.—*Jl. Trop. Med. & Hyg.* 1938. Dec. 1. Vol. 41. No. 23. pp. 377–380. With 2 figs.

[15] MANSON-BAHR (Philip) & RANSFORD (O. N.). Some Pigmentations of the Skin occurring in Patients from the Tropics: Carotinaemia, Haemochromatosis and Alkaptonuria.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1938. Nov. 26. Vol. 32. No. 3. pp. 395–404. With 1 plate. [22 refs.]

the pigment seemed to be in the food, although it could not be detected with certainty. Two cases of haemochromatosis are mentioned. These were seen in Egypt and Kenya and naturally caused some confusion because of the hepatomegaly. In East Africa one example of alkaptonuria was detected and this inherent disease probably predisposed the patient to the many tropical infections from which he suffered, malaria, amoebic dysentery, etc. It is laid down that patients with either of these two latter maladies (haemochromatosis and alkaptonuria) are unsuitable for life in the tropics.

Loewenthal's publications.—This author[16] has presented a long series of articles over three years which between them cover the whole range of dermatology as seen in negroes. It is certainly unfortunate that they have not been published in book form for they have appeared at varying intervals in the *Journal of Tropical Medicine and Hygiene.* It is even more unfortunate that the various subjects have been so cut that the second part of some sections appears weeks after the first. A very simple example will suffice. On page 99 of volume 42 there are brief notes concerning guineaworm infection; two months later, on page 159, there are pictures of guineaworm infection whilst the only letterpress concerned with the subject consists of the bibliography. These are very definite drawbacks but they may well not be the fault of the author. Nevertheless he has done great service in drawing attention to the differences, both apparent and real, which occur when diseases attack a black skin.

No exact definition of a "negro" is possible nor is it attempted. The term really includes all peoples with deeply pigmented skin, "kinky" hair and some skeletal peculiarities. In dealing with the anatomy of the skin[17] the following points are stressed. There is some relative thickening of the horny layer whilst the corium has a richer blood supply and the vessels lie nearer to the surface than in white skins. Most noticeable, however, are the large numbers of sweat and sebaceous glands; indeed the apocrine glands are three times more numerous than they are in the white skin. The sebaceous glands are often independent of follicles, even attaining a very large size when connected merely with lanugo hairs. Actually lanugo hair is sparse and the coarse hairs of the body, scalp and beard show a "frizzy" appearance consequent on elliptical cross-section and the fact that the follicles are themselves curved with the concavity directed towards the surface. Pigmentation in the nails is diffuse and increasing years often result in its appearance in longitudinal strips. Certain physiological functions receive special notice[18] and among these the question of heat regulation is perhaps of greatest importance, for black surfaces absorb heat more readily than do others. Yet the negro stands tropical heat better than does the European. The relative abundance of subcutaneous fat, the superficial position of the vessels and the numbers of sweat glands suffice to explain the adaptation. The pigment protects against the effects of excess of actinic

[16] LOEWENTHAL (Leonard J. A.). Diseases of the Skin in Negroes.—*Jl. Trop. Med. & Hyg.* 1936. Vol. 39. pp. 209–212; 250–251; 260–264; 276–278; 295–297. 1937. Vol. 40. pp. 4–8; 266–268; 277–281; 324–327. 1938. Vol. 41. pp. 21–26; 41–45; 58–64; 187–189. 1939. Vol. 42. pp. 20–25; 36–38; 53–60; 99–104; 159–161. With 58 figs. [Numerous refs.]

[17] See LOEWENTHAL, [16] 1936. pp. 209–212.

[18] See LOEWENTHAL, [16] 1936. pp. 250–251.

rays and additional fluorescence is given by increased sebum. The problem of actual colour and tinting[19] shows considerable degrees of variation. It may be said that the darkest tribes are those who have lived on poor soil for generations whilst groups that have led forest lives tend to have lighter skins. The blood mixtures of immigrant tribes modify all these considerations, whilst in mulattoes the colour varies in a way by no means proportional to the blood mixture but rather as though the higher grades of pigmentation are incompletely dominant over the lower. The difference in depth of colour in different parts of the body is well-recognized but this inherited factor follows two general rules: the trunk is dark dorsally and light ventrally, the extensor surfaces of the limbs are dark and the flexor aspects are light. It is obvious that the degree of laxity of the skin is of importance, *e.g.*, bending the knee lightens the colour by reducing the amount of pigment per square inch as the skin is stretched. Normally paler areas are the palms, soles, back of the heels, clavicular region, the sternal area, the midline of the back, the supraorbital ridge, upper eyelids, malar prominences, tip of nose and chin, in front of and behind the ears and, lastly, creases. Increased colour is seen in the nipples, the genitalia, back of neck, lower part of belly, lower eyelid, upper lip and the centre of the cheeks. The pigment concerned is of course melanin[20] and it is surprising that the total amount thereof is yet less than one gram. The mode of its formation, chemistry and distribution are fully discussed. Its presence in mucous membranes is interesting, thus 89 per cent. show patches in the centre of the gum surface, 40 per cent. show pigment in the cheeks, 38 per cent. on the hard palate, 33 per cent. on the tongue, 30 per cent. on the lips and 26 per cent. on the soft palate. Many children have a distinct rufous tinge in their hair which may not be lost until puberty, although it never persists after that age.

Certain dermatoses are particularly common among negroes.[21] A fibroplastic diathesis is seen in the ease with which keloids are formed, the hypertrophic scarring formed round chronic ulcers and in the perineum in uncomplicated gonorrhoea. Lichenoid lesions occur because the lichenoid papule is a common reaction to many different stimuli, a change which often renders exact diagnosis almost impossible. As a consequence few cases of prolonged irritation escape lichenification. Dermatitis papulosa nigra is naevoid and has never been reported in an individual of non-negro descent. On the other hand certain dermatoses are definitely more rare. Resistance to external irritants is increased, trauma from light is unusual and a natural resistance to certain diseases is believed to exist. Thus psoriasis, rosacea, eczema and seborrhoeic dermatitis are uncommon, whilst alopecia senilis and prickly heat are definitely rare. It is obvious that these people are less subject to cancer consequent on light and other external factors, but statements that melanoma and other forms of internal carcinoma are less common are much open to doubt. The author believes that individuals react to itching as diversely as do whites. The detection of the simpler lesions may be fraught with difficulties[22]. A macule is easily overlooked but pure

[19] See Loewenthal, [16] 1936. pp. 260–264.

[20] See Loewenthal, [16] 1936. pp. 276–278.

[21] See Loewenthal, [16] 1936. pp. 295–297.

[22] See Loewenthal, [16] 1937. pp. 4–8.

erythema can be seen to darken the affected area whilst local epithelial oedema lightens it. Often purpura cannot be diagnosed unless the mucous membranes or other organs are affected. Papules tend to be paler than the surrounding skin and post-inflammatory changes may include depigmentation, most marked in the achromia seen after yaws. A greyish appearance is given when the superficial layers are disturbed by scratching. Other colour changes may be due to fungi *e.g.*, the darkening seen in the presence of *T. nigrum.*

Congenital anomalies of pigmentation[23] include albinism in which consanguinity and heredity play big parts. The incomplete form or "freckled albino" is more common than is the complete variety. Partial albinism or "piebalds" are seen and the local change often consists of but a single tuft of white hair. In xanthism, which is fairly common, the hair is a golden or reddish brown. It is really a condition of diminished pigmentation which leaves the skin a warm brown colour. Increased deposition of melanin is seen in moles and naevoid patches or stripes. Mongolian spots sometimes persist throughout life. The acquired anomalies of pigmentation may be classified as idiopathic (or vitiligo) and as following some local or general disturbance[24] so far as diminution is concerned. In their differentiation the absence of any history of antecedent dermatosis is important but it is often possible to be certain without that as the advancing edges of the white patches are always regular and convex. Increased deposition of melanin may also occur after many skin diseases, particularly pellagra, syphilis, lichen planus, dermatitis exfoliativa, psoriasis, sarcoids, etc.

The opening paragraphs[25] of the sections devoted to fungous diseases are concerned with the many drawbacks from which medical mycology suffers. "Organisms are found to have two or more names at different, or even at the same stages of their life-cycle." "New species and varieties are reported almost daily without due regard to established works of reference, and fungi are repeatedly incriminated as pathogenic agents with little, if any, justification." Many of us echo these remarks with tired sighs. In the discussion of this huge subject the author has therefore adapted Vuillemin's classification to his own needs. This has been well done but the scattering of the articles through so many widely separated numbers of the journal makes it extremely difficult for the average reader. Diseases are thus dealt with in the order demanded by the mycological classification, a fact which leads to some surprising juxtapositions from the point of view of the clinician.

Blastomycosis is described as "any disease due to fungi which appear in the lesions as roundish or oval cells, at times budding, with complete absence of mycelium." The general clinical features are divided into primary and secondary characters. The former are again subdivided into papulo-ulcerative, verrucous and gummatous types. The latter are produced by abscesses and gummata in or under the skin which rupture to produce sinuses or deep ulcers. The usual pictures and treatments are described but reference is also made to "California disease" and its differences from the better known types of blastomycosis. The changes caused by yeasts and yeast-like fungi[26] are

[23] See LOEWENTHAL, [16] 1937. pp. 266–268.
[24] See LOEWENTHAL, [16] 1937, pp. 277–281.
[25] See LOEWENTHAL, [16] 1937. pp. 324–327.
[26] See LOEWENTHAL, [16] 1938. pp. 21–26.

divided into four clinical forms. The "blastomycotic" with its subcutaneous abscesses and sinus formation; the intertriginous, "continuous waterbath" and dysidrosiform; affections of the nails and, lastly, miscellaneous pictures such as those presented by cutaneous thrush, perlèche, prickly heat and some eczematoid eruptions. The trichomycoses are dealt with in the same article. These comprise piedra, trichonocardiasis (trichomycosia flava, etc.), trichomycosis nodosa of Behrend (leptothrix) and tinea nodosa or piedra nostras. In all these the fungal hyphae are woven together into a compact mass, cemented together by a viscous substance. In considering dermatitis verrucosa[27] it is pointed out that there is considerable confusion in the descriptions of the fungi, but it seems probable that only two species are really responsible, *Phialophora verrucosa* Medlar and *Trichosporum pedrosoi* vel *Hormodendron pedrosoi*. Similar organisms can apparently cause achromia parasitaria and other lesions closely resembling psoriasis and lichen planus. The descriptions of pityriasis versicolor and tinea flava are here broken but are continued in the next number[28]. Not only do these show as lighter patches but there is actual depigmentation with refractoriness to the regeneration of melanin on irradiation. Next we come to the actinomycoses and maduromycoses, all producing mycetomas. Their species are given in full detail but the main clinical description concerns itself with the ordinary actinomycosis due to *A. bovis* and which differs in no way from the disease as seen in whites. This section is succeeded by Tokelau ringworm, caused by *Endodermophyton* Castellani 1909. The description of this malady is broken abruptly and is not resumed until some seventeen weeks later[29], when sporotrichosis and rhinocladiosis are discussed in the same article.

In the first of three sections devoted to ringworm[30] favus, erythrasma, microsporon infections, *T. endothrix* and *T. ectothrix* are all dealt with. Special attention is paid to three particular varieties of trichophytosis: (1) the copper-coloured form of carate caused by *T. megnini*, (2) the whitish patches on the head and neck caused by *T. bovinum*, (3) calor de figo described by von Bassewitz in 1920 which shows plantar hyperkeratosis, fissuring and deep pigmentation. It is stressed[31] that trichophytide eruptions usually follow the deeper types of infection but that they may follow the more superficial infection, especially in negroes. These "-ide" rashes are often papular and with a particular tendency to hit the hair follicles of the neck and upper trunk in the coloured races. They may also be vesicular, pustular or lichenoid. Those types which have been said to resemble erythema scarlatiniforme, erythema nodosum or pityriasis rosea have not been detected in negroes. In discussing epidermophytosis the terms "Dhobi's itch" and "Hong-Kong foot" are used and we do not once come across the modern title of "athlete's foot" for this old-established Empire disease. The next section[32] opens with general considerations anent the diagnosis and treatment of ringworm and then proceeds to the first group of maladies caused by animal parasites. These comprise those resulting from helminth infection, schisto-

[27] See Loewenthal, [16] 1938. pp. 41–45.
[28] See Loewenthal, [16] 1938. pp. 58–64.
[29] See Loewenthal, [16] 1938. pp. 187–189.
[30] See Loewenthal, [16] 1939. pp. 20–25.
[31] See Loewenthal, [16] 1939. pp. 36–38.
[32] See Loewenthal, [16] 1939. pp. 53–60.

somiasis (bilharzia), cercarial dermatitis, which is rare in the negro, and the allergic phenomena such as urticaria which so often accompany these diseases. Filariasis with its consequent elephantiasis is next considered. Lymphostatic verrucosis can result from any condition which gives rise to chronic oedema of the feet including filariasis. Calabar swellings are classed as fleeting patches of oedema. Onchocerciasis[33], guinea worm, ground itch and creeping eruption are dealt with but briefly. It has already been mentioned that the last reference of all[34] contains only pictures and bibliography.

Sydney Thomson.

i. BRUMPT (E.). Un nouveau tréponème parasite de l'homme: *Treponema carateum*, agent des carates ou "Mal del Pinto." [**A New Treponema of Man,** *T. carateum*, **the Cause of Pinta.**]—*C. R. Soc. Biol.* 1939. Vol. 130. No. 10. pp. 942–945.

ii. ——. Faits nouveaux concernant l'agent et l'épidémiologie du caraté ou mal del Pinto de l'Amérique intertropicale.—*Ann. Parasit. Humaine et Comparée.* 1939. May 1. Vol. 17. No. 3. pp. 245–256. With 4 figs. on 1 plate. [23 refs.]

The author describes the clinical findings in this disease and quotes ALFONSO and GRAN Y TRIANA (1938) who found the organism in Cuba and FRANCESCO Y BLANCO who obtained it from 94 of 98 patients examined in Mexico. The treponema resembles *S. pallida* and is found in the malpighian layer of the skin and in the superficial lymphatic glands. The Wassermann reaction is usually positive in pinta.

The geographical distribution of the disease suggests, in the absence of evidence of contagiousness, that it is carried by a vector and species of Culicoides and Simulium have been suspected and the organism has been found in the stomach of the latter. The author suggests that as ticks of the genus Ornithodorus are common in the areas affected, they should be examined if the discovery of a susceptible animal is attained.

ii. This appears to be a rather fuller account of the material contained in the first paper. *C. W.*

RÍSQUEZ (Jesús Rafael). Nota sobre el agente causal de "la Pinta." [**The Cause of Pinta.**]—*Gac. Med. de Caracas.* 1939. Mar. 15. Vol. 46. No. 5. pp. 66–68.

The author writes in support of a spirochaete (Treponema) as being the causal organism of pinta. He notes its being found by Dr. José ALFONSO and Dr. Juan GRAN Y TRIANA in Cuba in August 1938, but quotes a monograph by Dr. Salvador González HERREJÓN published in 1927 and entitled *Nuevas Orientaciones para el Mal del Pinto*, in which the presence of a spirochaete "morphologically resembling the treponema of syphilis" in the deeper layers of the skin and in gland juice obtained by puncture is recorded. This view was not

[33] See LOEWENTHAL, [16] 1939. pp. 99–104.

[34] See LOEWENTHAL, [16] 1939. pp. 159–161.

accepted by all Cuban dermatologists who regarded the condition as a dermatomycosis. Investigations are to be undertaken to test the identity of the *carate* of Venezuela, the Mexican *mal del pinto* and the disease in Cuba, associated with this spirochaete. *H. H. S.*

i. Briceño Rossi (A. L.) & Iriarte (David R.). Consideraciones sobre el estado actual del carate y su distribución geografica en Venezuela y continuación sobre el estudio del carate en Venezuela. [**Carate and its Geographical Distribution in Venezuela.**]—*Gac. Med. de Caracas.* 1939. Mar. 15. Vol. 46. No. 5. pp. 68–78. With 9 figs.

ii. —— & ——. Consideraciones sobre el estado actual del cárate y su distribución geográfica en Venezuela. [**Carate and its Distribution in Venezuela.**]—*Medicina.* Mexico. 1939. June 25. Vol. 19. No. 342. pp. 208–223. English summary.

i. The first part of this article names the districts in which Carate is found in Venezuela as: Anzoátegui, Bolivar, Barinas, Miranda, Lara, Portuguesa, Zulia and the deltas of the Amacuro and Amazon. The age distribution of 281 cases is given: under one year 1; 1–5 years 12; 5–10 years 32; 10–15 years 53; 15–25 years 74; 25–40 years 67; 40–70 years 40; two were over 70 years of age. All in the active stage gave a positive Kahn reaction, and of 111 serologically examined a year after treatment had been started and showing no symptoms, 78 per cent. still gave a strong positive. Treatment employed comprises arsenicals and bismuth. Reinfection occurs but with a different coloured pinta from that for which treatment was originally given—slate-blue, white, or red. The authors have carefully examined the local lesions and the gland juice but have failed to find any spirochaete in four patients with the slate-blue carate.

In the second part the authors describe ten more cases of carate, all but two between 30 and 60 years of age, these two being 12 and 76 years respectively. None gave a history of any venereal disease nor could any indication of local venereal lesion be found. Four had enlarged glands and in one the spirochaete described in Cuban patients was discovered. It is described as being 15–18μ long, 12–16 turns, fine body with drawn out ends; shows lively rotatory movements but little progression; by dark ground examination this movement continues for 3–4 hours and then slows down. [See also this *Bulletin*, 1937, Vol. 34, p. 250].

ii. This is an account of the same work. *H. H. S.*

Fox (Howard). **Pinta in the Virgin Islands. Report of First Case to be recognized.**—*Arch. Dermat. & Syph.* 1939. Sept. Vol. 40. No. 3. pp. 433–435. With 1 fig.

This is a short note on a case of pinta seen in a negress of about 85 years of age in St. Croix, Virgin Islands. There were no signs of leprosy or cutaneous lesions of syphilis, but spinal punctures and X-ray examination of the heart were not performed. The blood Wassermann reaction was positive. There were diffuse slate-blue areas on the face

Pinta in a woman of 85 seen at St. Croix Hospital for Leprosy, St. Croix, Virgin Islands.

[Reproduced from the *Archives of Dermatology & Syphilology.*]

and extremities and extensive areas of partial or complete depigmentation. The appearances were typical of pinta and the positive Wassermann reaction is in favour of that disease. *C. W.*

BRICEÑO-IRAGORRY (L.). Sobre cromoblastomicosis. [**Chromoblastomycosis.**]—*Rev. "Clinica Louis Razetti."* Caracas. 1939. Vol. 1. No. 2. pp. 108–128. With 13 figs. [10 refs.]

A brief introduction giving the history of this condition first described a quarter of a century ago is followed by an account of a case in a negro, 46 years of age, showing verrucose and ulcerating lesions of the legs (see illustration). On Sabouraud's medium there developed slowly a mould which exhibited Carrión's three types of

Verrucose and ulcerating lesions of leg in case of chromoblastomycosis in a negro in Venezuela.

[Reproduced from the *Revista de la Clinica "Luis Razetti".*]

fructification: 1. Hormodendron, the conidiophores forming by differentiation of the mycelium; 2. Pseudo-Acrotheca, the conidiophores developing not at the end but below and around the terminal joint; 3. Phialophora type, as in *pedrosoi*, in which the terminal joint ends in a sort of calyx in the bottom of which the conidia develop.

On macroscopical and microscopical findings and the results of animal inoculation the condition was ascribed to *Hormodendron pedrosoi*, but seeing that all three types of fructification were observed the author wishes to create a new genus for those exhibiting all three at the same time and names it Carrionia, in the present case *Carrionia pedrosoi*. *H. H. S.*

BERTONI (Armando). Le attuali conoscenze sui dermomiceti dell' Africa Italiana. [**Dermomycetes at present known to occur in Italian East Africa.**]—*Riv. di Biol. Colon.* Rome. 1938. Aug. Vol. 1. No. 4. pp. 269–280. [17 refs.] English summary (2 lines).

The author gives brief notes on sixteen species of fungi observed in cutaneous affections in East Africa and the characters of the lesions

with which they have been found associated. The paper is purely clinical and in no way critical, nor is any experimental work recorded in connexion with any of the forms referred to. *H. H. S.*

BOLUS (Michael). **Dermatitis Venenata due to Ginkgo Berries.**—*Arch. Dermat. & Syph.* 1939. Mar. Vol. 39. No. 3. p. 530.

The ginkgo tree, a native of eastern China, also known as maidenhair tree and silver apricot, is commonly cultivated for its ornamental foliage. The seeds have a soft pulpy coating with a pungent odour, and before the seeds are planted this is usually removed. If the removal is carelessly done, or if the operator is susceptible, dermatitis may be set up. In the case reported a man of 29 years picked some of the berries and washed the pulp off with plain water (no soap) and a cloth. Two days later he felt a burning sensation in hands and eyelids followed by oedema, erythema and vesicles on the face. The vesicles spread to other parts of the body. Under treatment with soothing lotions and compresses the vesicles disappeared in a week leaving a dry, scaling erythema. A patch test with the berries was carried out ten days later with a marked allergic response. *H. H. S.*

NIÑO (Flavio L.). Contribucion al estudio de las tricopatias piedricas de Venezuela. [**Piedra in Venezuela.**]—*Mycopathologia.* The Hague. 1939. Vol. 2. No. 1. pp. 7–11. With 5 plates. English summary (6 lines).

" In Venezuela, as in Colombia, Brazil and Argentine, two trichopathies of the ' piedra ' type were found, namely one with black knots, caused by *Piedraia Hortai*, and another with light coloured knots, the so-called ' Colombian piedra.' The last named trichopathy is caused by *Trichosporium giganteum* Behrend, 1890, not causing hair lesions, and by *T. humahuaquensis* Mazza et Niño, 1932, causing hair lesions ; but it is possible that both species are referable to the same taxonomic entity."

AMOEBIASIS.

PRÉCIS OF ABSTRACTS IN THIS SECTION.

KAGY (p. 110) draws attention to the urgency of the problem of amoebiasis ; in the United States between 5 and 10 per cent. of the population are probably infected. He discusses modes of infection. CONNELL and FRENCH (p. 111) support the belief that no part of the United States is free from amoebiasis. Many infected students in a group examined were not ill enough to report for treatment, and for this reason diagnosis is frequently missed. Carbarsone and emetine treatment was very successful. In the United States Navy SAPERO and JOHNSON (p. 111) show that recruits from the Southern States are more frequently infected than others, but there was no excessive infection in men stationed at Panama or in the personnel of submarines. Men from China and the Philippines showed high rates, up to 26·1 per cent. There are only 4·6 cases of actual dysentery for every 1,000 carriers during the course of a year in the Navy.

MILLER (p. 113) gives figures of infection in Saskatchewan. NEGHME RODRIGUEZ (p. 113) reports that the disease is widespread in Chile. In Hungary BODROGI and MAKARA (p. 114) found more infection in villages than in towns, and especially in school-children.

TAYLOR (p. 114) discusses carriers in China and advocates regular supervision of servants and the strict prohibition of human excreta as fertilizer for vegetable gardens as well as the avoidance of vegetables from unknown sources.

SOHIER and JAULMES (p. 114) use Mallory's phosphotungstic haematoxylin for staining amoebae in fixed wet films.

CRAIG (p. 115) enriches culture media with Difco tryptone and Difco yeast extract. FRYE and MELENEY (p. 115) use a solution of liver extract in normal saline to cover the egg or serum slopes for cultivation of *E. histolytica*. This is successful and has the advantage that it can be repeatedly sterilized without injury. MELENEY *et al.* (p. 115) show that prolonged cultivation does not generally alter the pathogenicity of *E. histolytica*. BONNIN and ARETAS (p. 115) produced emetine-resistant cultures which retained some part of their acquired resistance even when grown for several passages in emetine-free media.

SWARTZWELDER (p. 116) describes the process of excystation in experimental work in dogs.

KONDO (p. 116) as a result of experiments concludes that vegetative *E. histolytica* cannot cause liver abscess in dogs or kittens, either after injection into the blood stream or directly into the liver.

TSUCHIYA (p. 117) infected rats with cysts from human carriers but the animals showed no symptoms and no lesions were found in the intestinal mucosa. Spontaneous recovery was usual and the rat therefore is not probably a natural host. BÖE (p. 117) finds that infection of rats is possible provided they have been previously fed on a diet rich in carbohydrates and cod liver oil. No symptoms or intestinal lesions are found, the infection being confined to the lumen of the intestine.

SOLARINO (p. 117) from careful blood examination in amoebic dysentery finds the only change to be a mild anaemia of the chlorotic type.

BANERJEE (p. 118) draws attention to the fact that less than half of those infected show dysenteric symptoms. He describes the other symptoms experienced by his patients and states that these were cured by emetine. In the tropics any complaint referable to the alimentary tract should be an indication for examination of the stools for *E. histolytica*.

MACDONALD (p. 118) describes a patient with liver abscess, who gave no history of dysentery and had no amoebae in the stools. SCAFFIDI (p. 118) describes a case of liver abscess.

CHUNG *et al.* (p. 119), by injecting lipiodol into amoebic liver abscess cavities and by periodical X-ray examination have shown that healing may take weeks or months. It should not, therefore, be considered that a short course of emetine, which may clear up the symptoms, is all that is necessary. Cavities may actually increase in size under emetine treatment owing to liquefaction of the necrotic wall. HUARD (p. 119) describes multiple liver abscesses in a patient in Indo-China which were associated with *Bact. coli* septicaemia. No *E. histolytica* were found in the pus but no search was apparently made for them in the stools. Ova of Ascaris were present in the pus, and SCOTT in comment suggests that the abscess may have been due to a wandering Ascaris subsequently disintegrated.

CELIS and MEDINA (p. 120) discuss four cases of amoebic lung abscess and consider that the lungs became involved by extension from the liver. GIRGIS (p. 120) describes two cases of multiple amoebic

abscesses in the lungs. Both patients had dysentery and liver abscesses and the pulmonary infection was probably the result of spread by the blood stream. MOTTA (p. 121) in describing the two cases diagnosed as pulmonary amoebiasis, ascribes one to a blood infection, the other to an air-borne infection.

A patient reported by GABRIEL (p. 121) showed extensive and deep ulceration of long standing arising from an anal abscess. He had been in tropical countries but denied previous dysentery and no protozoa were found in stools or discharge from the ulcer. Amoebiasis was suspected and emetine produced remarkable amelioration ; cysts were later found in the stools. SHIH *et al.* (p. 122) report amoebic ulceration of the penis in a Chinese farmer who had no other amoebic infection. Emetine rapidly cured the condition. From experiments in animals JORANSON and SIMONS (p. 122) suggest that *E. histolytica* may be a cause of human peptic ulcers.

ZANCAN (p. 123) gives results of the Triboulet test in amoebiasis. AOKI (p. 123) has obtained an extract from Entamoeba cultures which gives positive skin tests in amoebiasis.

On account of the similarity between the symptoms of emetine poisoning and beriberi ALAIN and RAGIOT (p. 123) give vitamin B_1 when there are symptoms of emetine intolerance, with success. CASTEX and DI CIO (p. 123) report on the value of Hoechst 5547, a preparation of bismuth and arsenic in amoebiasis. It is more useful in chronic than in acute conditions.

GHOSH (p. 124), realizing that acid stools favour the growth of *E. histolytica*, maintains an alkaline reaction after apparent cure in the hope of avoiding relapses. *C. W.*

VON KROGH (Mentz). Chronische Amöbiase. [**Chronic Amoebiasis.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1939. July. Vol. 43. No. 7. pp. 287–298.

This is a general account such as is to be found in all reputable text-books dealing with the intestinal disturbances occurring in chronic infections by *E. histolytica*, their symptoms, treatment and prognosis. It is of the nature of a medical lecture and as such reviews the subject adequately, but presents no new information nor any illustrative cases. *H. H. S.*

KAGY (Edwin S.). **The Amebiasis Problem.**—*Milit. Surgeon.* 1938. Aug. Vol. 83. No. 2. pp. 158–167. [Summary taken from *Public Health Engineering Abstr.* Washington. 1939. Apr. 29. Vol. 19. Signed Richard D. HOAK.] [Summary appears also in *Bulletin of Hygiene.*]

Studies by the U.S. Medical Corps indicate the gravity and urgency of a very real public health problem in amebiasis. Nature and scope of problem delineated.

Amebiasis, of which amebic dysentery is only a part of the clinical picture, probably exists throughout the world ; wherever sought by competent workers it has been found. As a result of studies covering every section of the United States it has been estimated that between 5 per cent. and 10 per cent. of the population of this country probably harbors Endamoeba histolytica. Although more prevalent in tropical regions it has been found wherever sought in the temperate zone. Clinically, persons infected may be divided into four classes in

which symptoms vary from none appreciable (the so-called healthy carriers) to those accompanying acute or chronic amebic dysentery.

Pollution of food or drink with feces containing cysts of Endamoeba histolytica allows transmission of amebiasis. Such contamination may occur through an infected water supply ; through the use of night soil in fertilizing garden truck, through handling food and drink by infected persons ; through fly droppings, and in other ways. Although food handling is held to be the most important means of transmission in communities with a satisfactory water supply, contamination of water supplies is thought to operate just as frequently and to result in an even greater number of infections where the water supply is obtained from dubious sources.

CONNELL (Frank H.) & FRENCH (Harry T.). **The Incidence and Results of Treatment of Subclinical Amebiasis.**—*Jl. Amer. Med. Assoc.* 1939. Aug. 19. Vol. 113. No. 8. pp. 649–652. [12 refs.]

It has been estimated by CRAIG that between 5 and 10 per cent. of the population of the United States harbour *E. histolytica.* The authors examined 1,351 males in 1934 and 1936, finding an incidence of about 1·8 per cent. after two examinations for each person by smear with Heidenhain's iron haematoxylin. A later investigation of 670 men showed 5 to be positive after a single smear examination. From these findings it appears that no part of the country is free from amoebiasis. Only 8 of 37 infected students were ill enough to seek medical advice and in no case had the diagnosis been made when they had done so. Treatment given to these infected persons consisted of carbarsone with emetine, and after the third day of treatment it was impossible to find amoebae in the stools. There were no toxic symptoms or relapses. These good results may perhaps be attributed to lack of opportunity for reinfection.

In the discussion on this paper, BORLAND stated that 58 per cent. of infections may be missed if only one stool is examined. LAKE made a plea for the use of the therapeutic test if other examinations are negative and there is reason for suspicion. PALMER questioned the pathogenicity of the small cyst forms, but Connell, in reply, considered that the size of the cysts was not a safe criterion in this respect.

C. W.

SAPERO (J. J.) & JOHNSON (C. M.). *Endamoeba histolytica* **and Other Intestinal Parasites. Incidence in Variously Exposed Groups of the Navy.**—*U.S. Nav. Med. Bull.* 1939. Apr. Vol. 37. No. 2. pp. 279–287. [17 refs.]

The paper gives an account of the examination, mostly at Panama, of groups of men in the U.S. navy for intestinal protozoal and helminthic infections. At the outset it is pointed out that some 10,000 men are stationed in parts of the world where amoebic dysentery is highly endemic, so that the chances of acquiring infections would appear to be considerable. The technique of all groups was similar, three specimens from each man being examined after the administration of a single dose of 2 drachms of fluid extract of cascara sagrada before the first specimen was collected. Both fresh saline and stained films were made from each case. Owing to the thinness of the films undoubtedly many helminthic infections were missed. As a control

naval recruits were examined at the naval training station in Norfolk, Va. It was found that recruits from the Southern States gave a higher infection rate than those from other States; thus, the incidence of *E. histolytica* was 14·7 per cent. in the former and 7·8 per cent. in the latter. It is thus clear that many of the infections found in men who had served for some time in the navy must have been acquired before the commencement of naval service.

TABLE I.

Intestinal Parasites in Naval Recruits—Control Group.

	Southern States	Other States
Total number of men examined	129	77
	Per cent.	Per cent.
Percentage of protozoal infections	63·6	48·1
Percentage of helminth infections...	17·1	—
E. histolytica	14·7	7·8
E. coli	39·5	28·6
E. nana	29·5	23·4
I. bütschlii	9·3	—
D. fragilis	17·1	10·4
G. lamblia	7·8	5·2
C. mesnili	2·3	2·6
T. hominis	2·3	2·6
N. americanus	14·0	—
T. trichiura	3·0	—
Naval Service: Average per man (weeks) ...	3·9	28·0

An examination of men who had been stationed at Panama and who had been repeatedly exposed to infections on shore during Central American cruises showed that no new infections had occurred, the *E. histolytica* incidence being 9·5 per cent., which is slightly lower than the 11 per cent. found amongst the recruits. An examination of a submarine group also showed that there had been no spread of infection during the close contact of infected and uninfected individuals which is inevitable in this kind of vessel. A different result was obtained with men returning from duty in Peiping, Shanghai and the Philippine Islands. Here an *E. histolytica* rate of 26·1 was obtained, an indication that fresh infections had been acquired in Asia. Similar higher rates were obtained for other parasites. Taking all groups together it was found that one-half of the men harboured one or more intestinal protozoa, while the helminthic rate (chiefly *Necator americanus*) was 5·6 per cent. The *E. histolytica* rate of 11·6 per cent. is about the same as that of the general population of the U.S.A., according to a number of surveys which have been carried out by different observers. With this high rate of infection amongst the general public there can be little danger of returning naval men influencing the incidence amongst the civil population in any appreciable manner. As regards the incidence of actual amoebic dysentery in the navy, with its 15,000

carriers of *E. histolytica*, there are only 4·6 cases for every 1,000 carriers during the course of a year. It is pointed out that, though some observers believe that at least 65 per cent. of all carriers show definite symptoms of infection, it has yet to be shown what are the determining factors necessary for the development of actual amoebic dysentery in apparently healthy carriers. *C. M. Wenyon.*

MILLER (Max J.). **The Intestinal Protozoa of Man in Midwestern Canada.**—*Jl. Parasitology.* 1939. Aug. Vol. 25. No. 4. pp. 355–357.

The paper gives the results of the examination of 254 persons for intestinal protozoa in Saskatoon, Saskatchewan, in the summer of 1938. There were three groups—hospital patients, students and nurses, orphan asylum children. Of the total 38·2 per cent. were positive for parasites. The institution group was most highly infected. Thus for *Entamoeba histolytica* the first and second groups combined, 207 persons in all, gave a percentage infection rate of not more than 1 per cent., while for the orphans, 47 children, the rate was 23 per cent. Double infections were found in only 3·3 per cent. of the combined group and in 32·6 per cent. of the institutional group. *C. M. W.*

NEGHME RODRIGUEZ (Amador). La amibiasis en Chile. [**Amoebiasis in Chile.**]—48 pp. With 8 figs. on 4 plates, 1 graph, 1 chart & 3 maps. [59 refs.] 1938. Santiago: Facultad de Biologia y Ciencias Médicas, Instituto de Biologia.

In this article the author gives an account of certain observations he has made on amoebiasis in Chile. The disease is widespread throughout the whole country and from the results of the examination of different groups its incidence corresponds with that which has been proved to occur in other similar localities. As regards the causative organism cultural and other work has been carried out and this, without adding to our knowledge of *E. histolytica*, indicates that the Chilean strains do not differ from those of other parts of the world. The main interest of the paper, which is largely a review of present knowledge, is that it calls attention to the high incidence of amoebic infections in this part of South America. *C. M. W.*

NEGHME RODRIGUEZ (Amador). Encuesta sobre amebiasis y otras enteroparasitosis en los conscriptos de la III Guarnición Militar (Concepción). Segunda comunicación. [**Amoebiasis and other Endoparasitic Infections in Chilean Recruits.**]—*Rev. Chilena de Hig. y Med. Preventiva.* 1938. July–Sept. Vol. 1. No. 7–9. pp. 367–369.

——. La amebiasis y otras enteroparasitos en los reclutas del ejercito Chileno. Tercera comunicación.—*Ibid.* pp. 370–371.

——. La amebiasis y otras enteroparasitosis en los conscriptos del ejercito Chileno. IV comunicación: Guarnición Militar de Arica.—*Ibid.* pp. 372–374.

——. La amebiasis y otras enteroparasitosis en los conscriptos del ejercito de Chile. V comunicación: Guarnición Militar de Valparaíso.—*Ibid.* p. 406.

These papers record the results of the examination of four groups of recruits in different districts of Chile for evidence of intestinal helminthic and protozoal infections. All the usual intestinal protozoa

were found, as also the common helminths. The number of cases examined and the percentage infected are set out in a series of tables.

C. M. W.

BODROGI (G.) & MAKARA (G.). Beitrag zu Entamoeba histolytica-Infektionen in Ungarn. [**Amoebiasis in Hungary.**]—*Med. Klin.* 1939. July 7. Vol. 35. No. 27 (1802). pp. 917–919.

In the Government Hygienic Institute during the six months September 1937–February 1938, among 2,526 examinations for protozoal infections 288 were found to have *E. histolytica*, in vegetative or cyst form. Most of the infections were among school-children and the authors concluded that the infection rates were higher in the villages than in the towns. In one village " 22 per cent. of the children examined were found infected " [but this figure conveys little as the number examined is not stated]. Brief notes are given of five cases in adults, with general remarks on the incubation period, symptoms, diagnosis and treatment.

H. H. S.

TAYLOR (H. W. Y.). **The Problem of the Amoebic Carrier.**—*Jl. Trop. Med. & Hyg.* 1939. Feb. 15. Vol. 42. No. 4. pp. 49–51.

In Mukden, Manchuria, six students at the Medical College in the autumn of 1937 were attacked with acute amoebic dysentery. A new cook was found to be passing *E. histolytica* cysts in quantity, and a table-boy was also a cyst-passer. The infection was thought to come from one or other of these. In Mukden, however, in spite of improved sanitation and a piped water supply replacing wells, the incidence of amoebic dysentery and colitis remains unchanged ; in fact the disease is now endemic. The number of cases increases in September–November and it is noteworthy that melons grown in fields fertilized with human excreta are eaten by all.

The author uses the above facts to stress that regular supervision of servants is a necessity, and periodical examination of all cooks and those handling food, and finally the avoidance of vegetables from unknown sources or—a counsel of perfection not likely to be adopted in China at present—strict prohibition of human excreta for vegetable gardens.

H. H. S.

SOHIER (R.) & JAULMES (Ch.). Etude d'un procédé simple de coloration des amibes par l'hématoxyline phosphotungstique. [**Simple Method of staining Amoebae with Phosphotungstic Haematoxylin.**]—*Bull. Soc. Path. Exot.* 1939. Jan. 11. Vol. 32. No. 1. pp. 25–27. With 4 figs. on 1 plate.

The authors point out that for staining dysentery amoebae in wet fixed films use may be made of Mallory's phosphotungstic haematoxylin in place of the more usual iron haematoxylin. It is noted that in the preparation of the stain the quantity of phosphotungstic acid to be added to the solution of haematoxylin varies with the brand of haematoxylin employed. The stain is prepared according to the formula of MASSON.

C. M. W.

CRAIG (Gladys M.). **Enrichment of Culture Media for** *Endamoeba histolytica.*—*Amer. Jl. Trop. Med.* 1939. Sept. Vol. 19. No. 5. pp. 483–489.

Working with cultures of *Entamoeba histolytica* in Cleveland's medium and Tanabe-Chiba medium, and making allowances for the concentration of amoebae in the inoculum used to commence cultures, it was found that the addition to the media of Difco tryptone and Difco yeast extract accelerated the growth of the amoebae. It is thought that such growth-stimulating substances give indications of methods of improving culture media for amoebae. *C. M. W.*

FRYE (William W.) & MELENEY (Henry E.). **Liver Extract as a Substitute for Serum in the Culture Medium for** *Endamoeba histolytica.*—*Science.* 1939. June 16. N. S. Vol. 89. No. 2320. pp. 564–565.

The authors have found that for the cultivation of *Entamoeba histolytica* the serum-containing liquids which cover the egg slant of Loeffler's blood serum can be satisfactorily replaced by 0·5 per cent. solution of liver extract (Lilly No. 343) in 0·85 per cent. sodium chloride solution. The medium is just as good for the maintenance of old strains as for the starting of new ones from amoebae or cysts. A number of other brands of liver extract have been found to be equally serviceable. On this medium *E. coli* and *Endolimax nana*, as well as Blastocystis, have failed to grow, whereas *Trichomonas hominis* and *Chilomastix mesnili* have been maintained till discarded. One advantage of the liver extract solution is that it can be sterilized repeatedly without injury. *C. M. W.*

MELENEY (Henry E.), FRYE (William W.) & LEATHERS (W. S.). **The Effect of Prolonged Cultivation on the Pathogenicity of Various Strains of** *Endamoeba histolytica* **for Kittens.**—*Amer. Jl. Hyg.* 1939. Mar. Vol. 29. No. 2. Sect. C. pp. 61–71. With 1 fig. [17 refs.]

In previous work the authors have studied the pathogenic activity of various culture strains of *Entamoeba histolytica*, employing routine methods of culture and a routine method of inoculation of the material to be tested directly into the intestine just above the ileo-caecal valve [see this *Bulletin*, 1938, Vol. 35, p. 585; 1939, Vol. 36, p. 293]. In this paper further experiments along these lines have been carried out and it has been found that all of the strains previously tested, with the exception of one, have retained the same pathogenic index as they had previously. The index of the one strain which varied has been for two years about 70 per cent. of its former index. The result shows that the pathogenic index of any strain generally remains unaltered for long periods of culture. *C. M. W.*

BONNIN (H.) & ARETAS (R.). Résistance acquise des amibes (*Entamoeba dysenteriae*) à l'émétine *in vitro*. [**Acquired Resistance of** *E. histolytica* **to Emetine** *in vitro*.]—*C. R. Soc. Biol.* 1939. Vol. 130. No. 5. pp. 495–496.

By exposing *Entamoeba histolytica* in cultures to increasing concentrations of emetine it was possible to obtain cultures resistant

to concentrations which were rapidly fatal at the start of the experiments. These exposed amoebae were small and formed minute pseudopodia and revealed other morphological changes. When grown for several passages in emetine-free media the amoebae returned to normal again but still retained some at least of the acquired resistance to emetine. *C. M. W.*

SWARTZWELDER (John Clyde). **Experimental Studies on *Endamoeba histolytica* in the Dog.**—*Amer. Jl. Hyg.* 1939. Mar. Vol. 29. No. 2. Sect. C. pp. 89–109. [28 refs.]

The author has tested the possibility of cysts excysting in the large intestine of dogs. Inoculation of cysts *per anum* up to the caecum and retardation of evacuation by various means failed to bring about excystation. In one instance in which cysts were inoculated at laparotomy above a ligature round the colon excystation occurred, but this was under such unnatural conditions that it is concluded that auto-infection from cysts of *E. histolytica* does not occur. Following oral administration of cysts excystation occurred in the small intestine in 1·5 to 4·5 hours. The process of excystation is described as a revolving movement of the quadrinucleate amoeba in the cyst, the production of a tear in the cyst wall and the escape of the amoebae. At no stage were amoebae with more than four nuclei found. The quadrinucleate amoebae were succeeded by uninucleate forms. Tissue invasion occurred within 24 hours. Cysts which had been refrigerated for 43 days at about 5°C. excysted when fed to a dog. Unripe cysts which were allowed almost no incubation period outside the body produced infection, while five of thirteen dogs became infected following ingestion of trophozoites, which were shown to pass through the stomach in a viable condition. Trophozoites were shown to withstand fairly high concentrations of hydrochloric acid *in vivo*. *C. M. W.*

KONDO (Hiroshi). **Investigations of Amoebic Dysentery. XXI. Experimental Studies of Amoebic Liver Abscesses in Dogs. XXII. Experimental Studies of Amoebic Liver Abscesses in Kittens.**—*Jl. Oriental Med.* 1939. July. Vol. 31. No. 1. [In Japanese pp. 13–22. With 1 plate. English summary p. 2; In Japanese pp. 23–27. With 1 plate. English summary p. 3.]

The author concludes that *E. histolytica* in the vegetative form is unable to cause liver abscess in dogs, young or old, on the following grounds. Using cultures of the amoebae and injecting them into the heart blood direct he could not produce abscesses in either lungs or liver; when mingled with blood—arterial, venous, or portal—*in vitro* the amoebae degenerated; even within 5 minutes of injection into the mesenteric veins no amoebae could be seen in the hepatic vein blood; direct injection into the parenchyma of the liver did not produce abscess unless bacteria were present; injection of amoebae and bacteria into the mesenteric veins gave rise to numerous microscopical abscesses, though no amoebae could be found in the abscesses or elsewhere in the liver. In kittens similar results were obtained.

H. H. S.

TSUCHIYA (H.). **Experimental Amebiasis in Rats with Cysts of Human Carriers with Especial Reference to a Probable Mechanism Involved.**—*Amer. Jl. Trop. Med.* 1939. Mar. Vol. 19. No. 2. pp. 151–162. [20 refs.]

Experiments were carried out with a view to testing the possibility of infecting rats with cysts of *E. histolytica* from human carrier cases. Cysts, after washing, were introduced into the lower part of the oesophagus of rats by means of a rubber catheter attached to a syringe, each rat receiving under ether anaesthesia about 500,000 cysts in 2 cc. of fluid. Of 78 rats used 13 became infected, the highest infection rate being amongst those in which the stomach was empty at the time of injection. Infected rats passed cysts in their faeces and these, administered to other rats, produced infections more readily. At the fifth passage the amoebae had adapted themselves to rats to the extent that the rate of infection was doubled. The infected rats revealed no symptoms of their infection, while the examination of the intestine post mortem did not disclose any lesions of the mucosa. Spontaneous recovery was the rule and it was concluded that in nature the rat is an incidental rather than a natural host of the dysentery amoeba. *C. M. W.*

BÖE (Johs). Experimentelle *Entamoeba histolytica*-Infektionen bei Ratten. [**Experimental** *E. histolytica* **Infection in Rats.**]—*Zent. f. Bakt.* I. Abt. Orig. 1939. May 12. Vol. 143. No. 7/8. pp. 393–398. [17 refs.]

It is shown that rats can be readily infected with *Entamoeba histolytica* by administration of cysts by the mouth, provided that the animals have been fed for the previous four days on a diet rich in carbohydrates and on cod liver oil. In a series of 20 animals thus treated all became infected, while 12 of them passed cysts. The infection was limited to the intestinal lumen, there being no symptoms during life and no sign of lesions at autopsy. The animals were killed after 7 to 30 days and in all *minuta* forms of the amoeba were found, while cysts were detected in a number. *C. M. W.*

SOLARINO (Giuseppe). Sul reperto ematologico nell'amebiasi. [**Haematological Findings in (Intestinal) Amoebiasis.**]—*Haematologica.* Pavia. 1939. Vol. 20. No. 7. pp. 617–644. With 2 charts. [53 refs.] French summary.

This study must have entailed a considerable amount of work of a somewhat irksome nature. The author has made a very full examination of the blood of nine patients with amoebic dysentery ; enumeration of red and of white cells, measurements of the former, differential count of the latter, and haemoglobin estimation by the Hellige-Sahli method. It is satisfactory to know that the changes noted showed but little departure—in some cases none—from the normal. Erythrocytes ranged between 4,500,000 and 5,700,000 per cmm., haemoglobin 80 to 105, and most between 91 and 100 per cent., colour index 0·8 to 1·03, most between 0·8 and 0·9 ; diameter of red cells between 6·5 and 7·3μ, average 7·09. Leucocytes ranged between 5,600 and 15,800 ; 8 were below 8,000 and 11 above this and as a rule not much above, the average of all works out at 9,337. The higher leucocyte counts were usually in the earlier acute stages. In short, the only change was a mild anaemia of the chlorotic type. *H. H. S.*

BANERJEE (Probodh K.). **Intestinal Amebiasis : its Clinical Manifestations.**—*Calcutta Med. Jl.* 1939. May. Vol. 35. No. 5. pp. 353–357.

The idea that intestinal amoebiasis is nearly always, if not invariably, associated with dysenteric symptoms is a common mistake, and one to which practitioners newly arrived in the tropics are prone ; hence the value of this article analysing 139 patients of whom less than half presented dysenteric symptoms. In another 59 the chief complaint was of dyspepsia—loss of appetite, indigestion, discomfort in the abdomen and troublesome flatulence, in many with constipation and heart-burn, five had pain and tenderness in the appendicular region [it is possible that the entamoebae were located there] ; four had purely gastric symptoms—acidity, pyrosis, gastric discomfort with constipation ; others, who gave no history of previous dysentery or diarrhoea, complained of heaviness and discomfort in the right hypochondrium, a little enlargement of liver, and loss of appetite. In all these cases the usual line of treatment had been tried in vain, until examination of the stools showed the presence of *E. histolytica* and appropriate treatment resulted speedily in cure. The moral, of course, is that in any case in the tropics of complaint referable to the alimentary tract faecal examination should be made and special search for *E. histolytica*. *H. H. S.*

CASTEX (Mariano R.). La clínica de la amebiasis. [**The Clinical Aspects of Amoebiasis.**]—*Prensa Méd. Argentina.* 1939. July 12. Vol. 26. No. 28. pp. 1347–1359. [61 refs.]

MACDONALD (Ian). **An Insidious Amoebic Liver Abscess.**—*Jl. Roy. Nav. Med. Serv.* 1939. Jan. Vol. 25. No. 1. pp. 73–74.

That amoebic abscess of the liver may have an insidious onset is a fact well known to all tropical practitioners, but that there should have been no indications of any preceding dysentery or of intestinal disturbance is sufficiently rare to warrant this case being recorded. The patient was a well-built man of 37 years who, when reporting sick, stated that he had had vague dyspeptic symptoms for 48 hours, pain below the ribs on the right side for 36 hours, increasing in intensity, but no looseness of bowels ; he had had no dysentery in the past, nor any pain before this attack. Faecal examination revealed no amoebae nor cysts of them. He was sent to hospital at Shanghai with a diagnosis of acute cholecystitis. Repeated examinations were still negative as regards amoebae. Operation was undertaken and a liver abscess found pointing just below the right costal margin. This was drained and emetine was given. Amoebae have not been found subsequently. [The report does not state whether discharge from the walls of the abscess was examined for them.] *H. H. S.*

SCAFFIDI (Vittorio), Jr. Ascesso epatico amebico primitivo a sintomatologia generale. [**Primary Hepatic Abscess with Systemic Symptoms.**]—Reprinted from *Clin. Med. Italiana.* 1938. Vol. 69. No. 5–6. 13 pp. With 3 figs. [20 refs.]

The patient, a man of 42 years, suffered with ill-defined symptoms, chills and fever, for six months, and during the sixth had enlargement

of liver, with pain, some degree of jaundice and diarrhoea. *E. histolytica* was then found in the stools. Two exploratory punctures were made into the liver at the site of the greatest pain but without finding pus. The blood showed red cells 2,710,000, haemoglobin 41 per cent., leucocytes 18,200 per cmm., with 83 per cent. polymorphonuclears. The condition cleared on exhibition of emetine, but reappeared a month later and again after a further interval of two months; each time a course of emetine was given. Seen six months afterwards the patient was keeping well. [The account would lose none of its interest if redundant matter were omitted. The facts that the patient's mother had 18 children at term and 3 miscarriages, that he himself was the happy result of an easy delivery and that he was suckled by his mother can have little bearing on his acquiring an amoebic hepatitis at the age of forty-two.] *H. H. S.*

CHUNG (Huei-Lan), KHOO (F. Y.), CHANG (Stephen K. P.) & MA (W. S.). **The Visualization of Amebic Liver Abscess.**—*Chinese Med. Jl.* 1939. Apr. Vol. 55. No. 4. pp. 357–370. With 12 figs.

A physician should not be satisfied with merely the clearing up of symptoms when he treats a patient with amoebic abscess of the liver. It is important for him to know to what extent the liver tissue has been destroyed and how long it takes for complete healing and not to regard the patient as no longer under his care when a ten-days' course of emetine has abolished the symptoms and rendered the stools free of amoebae.

By the authors' mode of procedure—aspiration of the pus, injection of air and 10–20 cc. lipiodol—lipiodol sinks to the bottom of the cavity and the air floats above it, and a fluoroscopy (or an X-ray photograph) will reveal the actual size of the cavity; to facilitate this pictures may be taken in different positions. By taking them at intervals the reduction in size can be followed up. Details are given, with photographs, of five cases in which this procedure has been carried out; and the authors conclude that, though a 7–10 days'course of 0·06 gm. emetine daily may relieve the symptoms, render the stools and abscess fluid free from amoebae and restore the leucocyte count to normal in a few days more, actual healing of the liver injury may take weeks or even months. Further, for a short period after emetine treatment the cavity may actually become larger owing to liquefaction of the necrotic wall. Two small abscesses with a communicating sinus may thus join up to form a single large cavity. In some cases a long time is needed before the lipiodol is completely absorbed, 12 months or more, and it is suggested that 20 cc. are more than is necessary, one-half or even one-quarter of that amount would probably suffice.

H. H. S.

HUARD (P.). Abcès du foie et septicémie à colibacilles. [**Hepatic Abscess and** *Bacterium coli* **Septicaemia.**]—*Bull. Soc. Path. Exot.* 1939. July 12. Vol. 32. No. 7. pp. 708–711.

The patient, an adult whose age is not stated, was admitted to hospital for haematemesis and the same evening twice passed blood in the stools (melaena), the cause being given as gastro-duodenal ulcer. Haemoculture yielded a growth of *Bact. coli*. Five days after entering hospital, there was dulness over the base of the right lung and enlargement of the liver. A sudden onset of pain in the epigastric

region and collapse led to exploratory laparotomy. The stomach and duodenum appeared to be normal, but the under surface of the liver presented an inflammatory swelling which, on being handled, burst and voided black, gaseous, malodorous pus. It contained streptococci and *Bact. coli* and some ova of Ascaris, but no amoebae were seen. Death took place six days later, there having in the meantime been further melaena and expulsion of ascarides. At autopsy the liver was found to contain several abscesses and signs of infarcts.

In the discussion which followed the recording of this case Dr. PONS pointedly remarked on the tendency of the author in recent years to stress the bacterial source of liver abscess in Indo-China as against the amoebic. In the present case nothing is said of any search in the stools for vegetative or cystic forms of *E. histolytica*, or of faecal examination at all. The abscess might be due to *E. histolytica* with secondary portal pyaemia. [No suggestion is made that the whole condition might be due to young migrating Ascaris setting up hepatitis and abscess. The worms were present in the bowel and ova were seen in the discharge from the abscess ; it is quite possible that the worm itself may have become disintegrated in the pus.] *H. H. S.*

WILMOTH (Clifford Lee). **Liver Abscess : its Diagnosis and Treatment.**—*Jl. Trop. Med. & Hyg.* 1939. Oct. 16. Vol. 42. No. 20. pp. 313–316. [13 refs.]

CELIS (Alejandro) & MEDINA (Miguel). Abscesos pulmonares amibianos aparentemente primitivos. [**Amoebic Abscess (Apparently Primary) of the Lung.**]—*Medicina.* Mexico. 1939. July 10. Vol. 19. No. 343. pp. 234–246. With 11 figs.

It is not quite clear what the authors imply by the term " apparently primary." Four cases are described in which the physical signs and X-ray findings indicate right basal pulmonary lesions which cleared up on administration of emetine. Three of the patients gave a history of previous dysentery and in all four cases cysts of *E. histolytica* were seen on faecal examination. The fourth had suffered for five months with fever, pain in the right side of the chest, troublesome cough with sputum containing pus and blood, diminished respiratory movement, dull note to percussion and so forth. The question is discussed whether the lung became involved by extension from the liver, the signs or the lesion in the latter having disappeared or been overlooked, or whether the lung was invaded by the blood or lymphatic route without involving the liver. The authors decide in favour of the former because all showed adhesions between the liver and the diaphragm. [In view of the history of preceding dysentery, the presence of cysts of *E. histolytica* in the stools, and the final decision as to the mode of invasion of the lung, the use of the word " primary " is hardly justified.] *H. H. S.*

GIRGIS (Sami). **Pulmonary Amoebiasis.**—*Jl. Egyptian Med. Assoc.* 1939. July. Vol. 22. No. 7. pp. 402–418. With 11 figs. [11 refs.]

Two cases are described with commendable detail, giving the clinical history, the physical examination and post mortem findings, macroscopical and microscopical, in the lungs. From the conditions found the author believes that infection was carried from the liver to the lungs by the blood-vascular route through the right side of the heart to the pulmonary circulation, for entamoebae were found in the

pulmonary arterioles. In the first patient, a man of 38 years, the amoebae were found within and without the vessels, and lying free in the pulmonary abscess cavity. Both this man and the second, aged 60 years, suffered from dysentery and from amoebic abscess of the liver. As would be expected if the infection was carried to the lungs by the blood stream, the abscesses were multiple and not individually large. The amoebae were not seen actually within the bronchioles but from breaking down of lung tissue they might be seen on examination of the sputum. *H. H. S.*

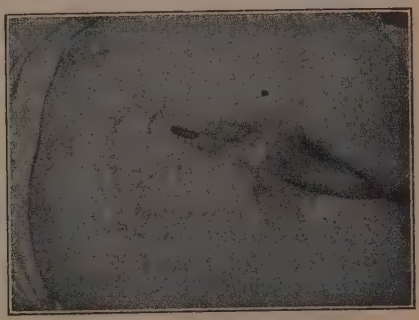
MOTTA (Orlando Cabral). Amebiase pulmonar. [**Pulmonary Amoebiasis.**]—*Brasil-Medico.* 1938. Aug. 20. Vol. 52. No. 34. pp. 751–758. With 7 figs. English summary.

Two cases are described which were diagnosed as pulmonary amoebiasis owing to the discovery of what were taken to be *Entamoeba histolytica* in material coughed from the lung. In both cases *E. histolytica* was present in the faeces. In one case there was suppuration with abscess cavity formation at the base of the right lung, in the other case the condition was one of bronchitis. In the first case the abscess cavity was drained, while emetine and arsenicals were administered. Though a temporary improvement occurred death took place some months later. The second patient made a good recovery under the medical treatment. The paper recounts in detail the various examinations of the lungs and bronchi which were carried out and a series of X-ray photographs illustrate the findings. It is said that in the suppurative case the spread of infection to the lung was probably by way of the blood vessels, while the features of the bronchitic case, if indeed it was actually one of bronchial amoebiasis, suggested infection of the lungs by way of the air. *C. M. Wenyon.*

GABRIEL (W. B.). **A Case of Amoebic Ulceration of the Rectum and Anus.**—*Proc. Roy. Soc. Med.* 1939. June. Vol. 32. No. 8. pp. 902–904 (Sect. Surg. pp. 54–56). With 5 figs.

This is a remarkable case of success of emetine treatment. The patient a man of 35 years who had served in the Army in India,

Condition on admission to hospital in April 1938.



Ulceration completely healed, November 1938.

Amoebic Ulceration of Rectum and Anus.

[Reproduced from the *Proceedings of the Royal Society of Medicine.*]

Mesopotamia, Malta and China, but had not been ill in any of these places and denied having suffered from dysentery. In 1935 he developed an anal abscess which ruptured and continued to discharge for two and a half years. In April 1938 he was very ill, emaciated and anaemic, with a temperature 101°F. and pulse 120 per minute. He showed an enormous ulcer with necrosis of muscles and gangrene of skin and subcutaneous tissue. Kahn and Wassermann reactions were negative. No protozoa were seen in faeces or in scrapings from the lesions, but on the suggested possibility of its amoebic origin emetine hydrochloride gr. ½ b.d. was given and even in four days the improvement, both local and general, was marked. Nine days after beginning the treatment cysts of *E. histolytica* were seen in the faeces, and by the next day the ulceration had cleaned, sloughs separated, leaving a smooth granulating surface. After 4 days' interval he was given a ten-days' course of E.B.I. (gr. ii at night) and an injection of 2 oz. of 2·5 per cent. yatren into a distal colotomy wound. His condition in April and in November 1938 is shown in the accompanying illustrations. *H. H. S.*

SHIH (H. E.), WU (Y. K.) & LIEU (V. T.). **Amoebiasis of the Penis.**—*Chinese Med. Jl.* 1939. Feb. Vol. 55. No. 2. pp. 139–145. With 5 figs.

Cutaneous amoebiasis has been recorded [see this *Bulletin*, 1925, Vol. 22, p. 368] but not as a primary condition. LEE in 1932 reported invasion of a carcinoma of the cervix by *E. histolytica* and in 1933 NGAI and FRAZIER reviewed and discussed 27 cases reported in the preceding 42 years [see this *Bulletin*, 1934, Vol. 31, p. 651]. Cases usually arise either from an abscess (of the liver, for example) discharging on the abdominal wall, or from extension from the bowel. In the present instance the origin was not discovered. A Chinese farmer, 54 years of age, had an ulceration of the penis, of 5 months' duration. It was considered to be either malignant or pyogenic. Examination of the exudate and superficial layers revealed amoebae, with all the characters of *E. histolytica*. There was no history of dysentery; faeces were examined repeatedly for Entamoeba with negative results, and he denied extraneous intercourse. Treatment with emetine brought about a speedy cure. Unfortunately his home was too far off for his wife to come for examination—consequently a likely source—dysentery in his wife—could not be ruled out. *H. H. S.*

JORANSON (Yngve) & SIMONS (Joseph). *Endamoeba histolytica*, **Experimental Infection of the Stomachs of Dogs and Cats.**—*Arch. Pathology.* 1939. Feb. Vol. 27. No. 2. pp. 218–238. With 7 figs. [26 refs.]

In a series of 51 dogs and 8 cats cultures of *Entamoeba histolytica* were inoculated into the sub-mucosa of the pyloric region of the stomach by passing the syringe needle through the peritoneal surface at laparotomy. In 15 dogs and 2 cats death followed the resulting gastric lesions, which varied in character from nodules to open ulcers. In only two of such lesions were amoebae actually seen in serial sections. It is evident that *E. histolytica* is able to withstand the action of gastric juice. It is thought that the resemblance of the experimental lesions to the human peptic ulcers suggests that *E. histolytica* may be a cause of these. *C. M. W.*

ZANCAN (Bernardo). La reazione di Triboulet nelle enterocolopatie parassitarie. [**Triboulet Test in Parasitic Intestinal Infections.**]—*Arch. Ital. Sci. Med. Colon. e Parassit.* 1939. July. Vol. 20. No. 7. pp. 390–407.

The paper gives the result of the application of the Triboulet test, which is merely a modification of the Schmidt test for the presence of bilirubin, to the faeces of a number of cases of intestinal protozoal and helminthic infections. Only in cases of *Entamoeba histolytica* was the percentage of positive results appreciably higher than those obtained from normal individuals. Testing for blood at the same time it was found that this was present in 32·1 per cent. of the patients giving a negative Triboulet reaction and in 38 per cent. of those in whom it was positive. *C. M. W.*

AOKI (Hisashi). **Investigations on Amebic Dysentery. XX. A New Simple Method for the Diagnosis of Amebiasis.**—*Jl. Oriental Med.* 1939. May. Vol. 30. No. 5. [In Japanese pp. 939–943. English summary p. 264.]

The author states that he has obtained from Entamoeba cultures an extract which in patients with amoebic dysentery always gives a positive cutaneous reaction, usually but not invariably positive in cyst-passers, negative in bacillary dysentery, typhoid and other intestinal disease. [The method of extraction is not given in the English summary.] *H. H. S.*

ALAIN (M.) & RAGIOT (Ch.). De la diminution des effets toxiques de l'émétine par l'emploi de la vitamine B_1. (Essais effectués au cours du traitement de l'amibiase.) [**Vitamin B_1 in Emetine Intoxication.**]—*Bull. Soc. Path. Exot.* 1939. Mar. 8. Vol. 32. No. 3. pp. 300–303.

The authors note the varying dosage of emetine deemed necessary to eradicate amoebiasis and that before the end aimed at is achieved toxic effects may show themselves—digestive, circulatory and nervous. The last may partake of the nature of a polyneuritis resembling that of beriberi. On this account the authors employed vitamin B_1 for treatment of these cases with good results and a short step from this was to use the vitamin with the emetine when there were indications of intolerance. They found it very successful in such cases and quote brief notes of six such ; the dose of vitamin was 1 cgm. daily for adults. *H. H. S.*

CASTEX (Mariano R.) & DI CIO (Alfredo V.). El preparado 5547 en el tratamiento de la amibiasis intestinal. [**The Treatment of Intestinal Amoebiasis by Hoechst 5547.**]—*Prensa Méd. Argentina.* 1939. May 31. Vol. 26. No. 22. pp. 1041–1043.

Hoechst 5547 is a preparation designed to aid the absorption of arsenic by combining it with bismuth ; it contains 16·6 per cent. arsenic with 33·3 per cent. bismuth. It is a dark brownish powder, insoluble in water, put up in small tablets (grageas) coated and containing 0·25 gm. each.

The authors have tested it on 50 patients passing *Entamoeba histolytica* or its cysts or both. They gave it at first in doses of 0·5 gm.

thrice daily, but this was followed by tachycardia, palpitation, weakness and insomnia; they then reduced the dose to half, giving it for 6 days and the result was disappearance of the amoebae, with improvement in symptoms and the general state of the patients. It proved best in cases of chronic intestinal amoebiasis. In those with hepatic mischief it should be given very cautiously, if at all, and it is not suitable for children. Tenesmus and spasm do not disappear so rapidly as the other symptoms; this is ascribed to the large amount of bismuth present. In such cases the Hoechst 5547 may be combined with an antispasmodic; rivanol is suggested. *H. H. S.*

GHOSH (H.). **A Probable Cause of the Difficulty of treating Chronic Amoebic Infection in this Country.**—*Indian Med. Gaz.* 1939. Jan. Vol. 74. No. 1. pp. 27–28.

The author stresses the well-known fact that patients after apparent cure of amoebiasis relapse again at intervals when treatment is stopped. He noted that in such cases the reaction of the stool was often, in fact usually, acid, which favours growth of *E. histolytica*. He, therefore, decided to regulate the diet to maintain an alkaline reaction of the faeces and found that so long as this occurred there was no relapse. The number of cases (three) is too few for valid deduction, but it is a view worth following up. *H. H. S.*

MALARIA.

PRÉCIS OF ABSTRACTS IN THIS SECTION.

VOGEL and RIOU (p. 125) discuss malaria in the French colonies.

LAMOTE (p. 126) notes that *P. falciparum* is the only parasite found in young children in a part of the Belgian Congo. PANSINI (p. 126) reports that in Italian East Africa *P. vivax* is more commonly found than *P. falciparum*. ALVES (p. 127) reports two cases of *P. ovale* infection in S. Rhodesia.

MARKOVICH (p. 127) records studies, which cannot be further abstracted, in the biology of *A. maculipennis*. PRENDEL and SOMOV (p. 127) report on the habits and relative prevalence of three subspecies of *A. maculipennis* near Odessa.

The explanation of the occurrence of malaria on the Witwatersrand, where *A. gambiae* and *A. funestus* do not normally occur, appears to be that infected *A. gambiae* have been introduced in motor cars from known malarious areas. It is not probable that they will survive the winter (DE MEILLON and GEAR, p. 128).

The vectors in the island of Poulo-Condore off Cochin-China are *A. ludlowi* and *A. subpictus*, both salt-water breeders. FARINAUD (p. 128) shows that there is frequent importation of fresh strains of malaria and that this, with the state of undernourishment and confined living space, has great importance in maintaining high prevalence.

VAN DEN BERGHE and KOVACS (p. 129) show that *P. falciparum* tends to attack mature red cells rather than reticulocytes, though the latter may be affected.

MURGATROYD *et al.* (p. 129) record an instance of long latent period in *P. ovale* infection. The attack was thought to be precipitated by

vaccination against yellow fever. STRICKLAND and BAIRD (p. 129) report malaria in six infants less than 8 days old. GINGOLD and FLORESCO (p. 130) discuss appendicitis with coincident malaria or simulated by malaria. Indications for differential diagnosis are given. CHATTERJEE (p. 130) reports three cases of malaria in which urticaria was a constant accompaniment.

CHUB and PANFEROVA (p. 130) show that Henry's reaction does not become positive until the onset of clinical symptoms however long the incubation period. SCOTTI (p. 131) obtained positive agglutination reactions with *Br. melitensis* in sera of patients with malaria.

NIVEN (p. 131) shows that on an estate in an infested area, atebrin 0·3 gm. once weekly was effective in suppressing clinical malaria and produced marked reduction in gametocyte carriers, especially in benign tertian cases. From experiments in Sardinia, CASINI (p. 132) concludes that by atebrin or quinine prophylaxis it is possible to reduce malaria symptoms, spleen and parasite rates and improve the general health, but not to eradicate malaria. Atebrin is more effective than quinine in preventing subtertian malaria. RASHINA and KHOVANSKAYA (p. 133) have obtained good results in a district in Russia where malaria is seasonal by treatment with acriquine and plasmocide and the administration of plasmocide during the transmitting season to all persons who had previously had malaria. The anophelines breed in irrigation canals and anti-mosquito measures are necessary for proper control. BAEZA (p. 133) reports general improvement in health and considerable reduction in spleen and parasite rates after the administration of plasmoquine 0·02 gm. (adult dose) twice weekly in Perak. Further work on the prophylaxis of malaria by the administration of premaline twice each month to about 27,000 people in an intensely malarious district in Tunis is reported by DUPOUX *et al.* (p. 134). No anti-mosquito measures are taken but the results achieved in the reduction of the parasite and spleen rates are remarkable and patients treated with premaline and then given the prophylactic course (which lasts from June to November) have not relapsed.

NIVEN (p. 134) has studied the action of prontosil in malaria ; it is less effective than quinine and is not an efficient gametocide. He (p. 135) reports unfavourably on paludex in treatment. DECOURT *et al.* (p. 135) report unfavourably on the gametocidal action of cilional in *P. falciparum* infection, and prefer rhodopraequine.

FARINAUD (p. 136) details the measures which have been successful in reducing the incidence of malaria in an estate in the far east.

SATTA (p. 136) reports unfavourably on hexachlorethane as a larvicide.

HOLMES (p. 136) describes the value of mosquito traps in any control scheme in Kuala Lumpur. *C. W.*

VOGEL (E.) & RIOU (M.). Les maladies épidémiques, endémiques et sociales dans les colonies françaises pendant l'année 1937. Paludisme. [**Malaria in French Colonies during 1937.**]—*Ann. de Méd. et de Pharm. Colon.* 1939. Apr. Vol. 37. Supplement. pp. 324–353.

This report gives information about the prevalence of malaria during 1937 in all the French colonial possessions and in the mandated

territories. The information is based very largely on hospital and dispensary statistics. It is not possible to summarize a report such as this: the thirty pages are in fact a very condensed summary of information contained in very numerous health reports. The introduction to this Supplement to the *Annales* states that for French colonies as a whole malaria continues to be the most formidable of the endemic diseases, by reason of its effects on mortality and the extent of its prevalence. In Indo-China it is one of the chief obstacles to the transference of the surplus population of Tonking and Annam to land undergoing development elsewhere. The introduction of the synthetic drugs has contributed much to the treatment and prevention of the disease, but collective prophylaxis is still hampered by the insufficiency of large-scale sanitary improvement schemes that are always so costly.

Norman White.

STRICKLAND (C.). **A Study in Physiography in Relation to Malaria, in the Orissa Coastal Tracts.**—*Riv. di Malariologia.* Sez. I. 1939. Vol. 18. No. 1. pp. 38–44. With 4 plates.

This paper covers much the same ground as the author's contribution to the *Indian Medical Gazette* [see this *Bulletin*, 1939, Vol. 36, p. 137].

N. W.

LAMOTE. L'endémicité paludéenne dans le cercle de Mokamo-Kwango. [**Endemic Malaria in Mokamo-Kwango.**]—*Ann. Soc. Belge de Méd. Trop.* 1939. Mar. 31. Vol. 19. No. 1. pp. 33–38.

Mokamo-Kwango is situated in the Congo between 4° and 5°S. and 18°E. The paper gives the result of the blood examination of a certain number of the native inhabitants of the region. The parasite indexes were :—for infants below one year of age, 68 per cent. ; for ages 1 to 3, 76·1 per cent. ; for ages 3 to 15, 78·3 per cent. All parasites found were *P. falciparum*. The absence of both *P. vivax* and *P. malariae* among the young children of this region is strange. *N. W.*

PANSINI (G.). La malaria nei lavoratori reduci dall'A.O.I. [**Malaria among Labour Forces repatriated from Italian East Africa.**]—*Riv. di Malariologia.* Sez. I. 1939. Vol. 18. No. 1. pp. 23–37. English summary.

At Aversa there is an institutional centre for workers invalided from Italian East Africa. Of 7,400 admitted to the hospital during thirteen and a half months there were 3,500 cases of malaria ; the author gives certain information about these malaria cases. The disease appears to be very widespread in Abyssinia, especially in the lowlands but also at elevations as high as 2,000 metres. Attacks occur in spite of prolonged quinine prophylaxis. *P. vivax* was more commonly observed than *P. falciparum* in the proportion of 4·5 : 1. Most of the patients were discharged from hospital after an average stay of three months, fit for work, but a reduction of the enlarged spleen to normal proportions was only rarely observed. *N. W.*

ALVES (William). **Two European Infections with** *P. ovale* **in Southern Rhodesia.**—*South African Med. Jl.* 1939. Apr. 8. Vol. 13. No. 7. pp. 250–251. With 12 figs.

A very brief description of two mild cases of malaria treated in hospitals in Salisbury, both in Europeans, in which scanty parasites having all the characteristics of *P. ovale* were found. Outline drawings of some of the forms of parasite seen are reproduced. *N. W.*

MARKOVICH (N. J.). La biologie de l'*Anopheles maculipennis* dans le nord. [**Biology of** *A. maculipennis* **in the North.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1939. Vol. 8. No. 1. [In Russian pp. 89–107. With 8 figs. French summary pp. 107–108.]

The observations recorded were made in the town of Solvychegodsk, 61°21′ N., where there are found *A. maculipennis messeae* and *A. maculipennis maculipennis.* Female mosquitoes begin to leave their winter shelters at the end of March and the exodus is completed about the time the first generation begins to hatch out. This first generation hatches out in mass between the 19th and 23rd of June, and the second at the end of July or the beginning of August, coincident with the beginning of the cessation of sexual activity and the fattening of the females. There is a mass retreat of sexually inactive females to dwelling houses at the end of August, but isolated engorged females can still be found in September.

There is an apparent relationship between the departure of mosquitoes from dwellings and the intensity of the light ; no other meteorological factor appears to be of much importance. In summer during the light nights all the females leave when prompted to do so by mature ovaries or thirst ; in the autumn darkness prevents the departure of some of them. *A. maculipennis* is active and feeds within a very large range of temperature and humidity. During the light nights of summer it attacks all the night but with slightly diminished intensity during the darkest hours. It attacks outside as well as in the dwellings, and it is the outside attack which is of chief epidemiological importance. There is a considerable deviation to cattle, and stables are favoured as daytime resting places. From 4·5 to 7·4 per cent. of engorged females captured in stables contained human blood. Among 940 females dissected between the 28th April and the 10th September four were found harbouring oöcysts. The curve of the distribution of females according to the dimensions of the ampulla is bimodal. The first summit formed by sexually inactive females occurs in July ; the second is formed by sexually active females. *N. W.*

PRENDEL (A. R.) & SOMOV (A. A.). **On the Epidemiological Importance of the Subspecies** *Anopheles maculipennis.*—*Med. Parasit. & Parasitic Dis.* Moscow. 1938. Vol. 7. No. 6. [In Russian pp. 860–872. With 6 figs. [19 refs.] English summary pp. 872–873.]

The observations recorded were carried out in the Odessa region of the U.S.S.R. Three subspecies of *A. maculipennis* were encountered, *messeae, atroparvus* and *typicus.* In areas in which *atroparvus* predominates its relative prevalence is at a maximum in the spring and autumn ; in September it constitutes nearly a hundred per cent. of the catches in cow-houses. Average catches of anophelines in malarious

regions varied from 518 to 1,201 in stables and from 8·7 to 25·4 in dwellings; in areas of moderate endemicity from 91·2 to 137·9 in stables and 2·6 in dwellings; in malaria-free areas 67·2 in stables and 0·8 in dwellings. In autumn *A. maculipennis atroparvus* congregates in cow-houses but not in dwellings, while *A. maculipennis messeae* disappears from cow-houses and congregates in cellars. The subspecies have a somewhat different seasonal prevalence; *atroparvus* has two maxima, in July and September; *messeae* is most prevalent in June–July. Precipitin tests showed that of Anopheles captured in dwellings 19 per cent. contained human blood; of those captured in stables from 3·4 to 9 per cent. contained human blood. *N. W.*

DE MEILLON (B.) & GEAR (James). **Malaria contracted on the Witwatersrand.**—*South African Med. Jl.* 1939. May 13. Vol. 13. No. 9. pp. 309–312. With 1 map.

Recently several cases of malaria have been contracted on the Witwatersrand, an exceptional occurrence. Normally, for climatic reasons, neither of the accepted vectors of malaria in South Africa, *A. gambiae* and *A. funestus*, occurs on the Witwatersrand. The anophelines that have been collected in Johannesburg and neighbourhood are all zoophilic species—*squamosus*, *pretoriensis*, *coustani*, *coustani* var. *tenebrosus*, *rhodesiensis*, *demeilloni* var. *carteri*, *natalensis*, *cinereus*, *rufipes*, and *longipalpis*. When *A. gambiae* breeding is very widespread in neighbouring districts overflow into the Witwatersrand may take place; this is what has occurred. Mechanical transport has assisted this migration. It is not probable that the *A. gambiae* so introduced will survive the winter unless this proves to be exceptionally mild. Evidence has been obtained of the breeding of *A. gambiae* in the northern suburbs of Johannesburg and to the north of that city, but the chances of any of them becoming infected are remote. The evidence seems to show that infection in the cases that occurred may be ascribed to infected anophelines brought in by motor cars from known malarious areas. *N. W.*

FARINAUD (E. M.). Le paludisme à Poulo-Condore. [**Malaria in Poulo-Condore.**]—*Ann. Inst. Pasteur.* 1939. May. Vol. 62. No. 5. pp. 540–570. With 2 figs.

Poulo-Condore is a little island off the coast of Cochin-China, 45 miles from the mouths of the Mekong. It is 12 kilometres long and 2 to 5 kilometres wide. It is used as a penitentiary and convict station. The long and interesting history of malaria in the island is related at length. Severely endemic in parts of the island epidemics of considerable violence were experienced in 1934 and 1935. The most important vectors are *A. ludlowi* and *A. subpictus*, both salt water breeding species. It is possible that other mosquitoes also carry infection; *A. leucosphyrus* was found infected.

The human factor is more than usually important in determining the high prevalence of malaria; there is a frequent importation of fresh strains of infection and a certain degree of undernourishment and conditions inseparable from living in confinement are predisposing causes.

Very great improvement has recently been effected. Filling low-lying breeding places has contributed to the improvement but more

has resulted from the administration of synthetic drugs, quinacrine and praequine. Several methods of administration were tried. Quinacrine alone appears to have given as good results as quinacrine and praequine. *N. W.*

VAN DEN BERGHE (L.) & KOVACS (L.). Réceptivité des erythrocytes et des réticulocytes aux schizontes jeunes de *Plasmodium falciparum*. [**Susceptibility to Invasion by Schizonts of** *P. falciparum* **of Mature Red Cells and Reticulocytes.**]—*Ann. Soc. Belge de Méd. Trop.* 1939. Mar. 31. Vol. 19. No. 1. pp. 87–90. [11 refs.]

The authors' observations were made on six African young children naturally infected with *P. falciparum*, and an adult European who was suffering from an exceptionally massive infection with that parasite which proved fatal. It was found that young schizonts of *P. falciparum* parasitize red cells of all ages but the number of mature red cells so infected very greatly outnumber infected reticulocytes, both actually and proportionally to the numbers of such cells present in the peripheral blood. In two cases not a single infected reticulocyte could be found.

N. W.

MURGATROYD (F.), FINDLAY (G. M.) & MACCALLUM (F. O.). **Long-Latent Infection with** *Plasmodium ovale* **becoming Manifest after Yellow-Fever Vaccination.**—*Lancet.* 1939. June 3. pp. 1262–1263.

An apparently healthy young man had returned from West Africa eight months previously when he was vaccinated against yellow fever with pantropic tissue-culture virus. He had never had malaria. While in Africa and for a month after his return to Britain he took five grains of quinine daily. He had taken no quinine during the six months preceding vaccination.

Six hours after vaccination an attack of shivering ushered in an attack of malaria characterized by well marked periodicity, alternate evenings, jaundice and severe vomiting. Blood examination revealed a pure infection with *P. ovale*. It is reasonable to consider the long latent period as a protracted incubation period, though there are no recorded cases of such prolonged incubation periods in *P. ovale* infections.

The majority of persons immunized at the Wellcome Research Institution by inoculation with the present strain of tissue-culture virus have little or no reaction. It would seem that vaccination against yellow fever is one of a number of non-specific factors which may either precipitate a malaria relapse or permit a latent infection to become manifest. *N. W.*

STRICKLAND (C.) & BAIRD (S. Y.). **Early Infantile Malaria.** [Memoranda.]—*Brit. Med. Jl.* 1939. May 13. p. 979.

This is a record of six infants who developed malaria 15 hours, 3 days, 5 days, 6 days, 7 days and 7 days after birth, respectively. All the cases occurred in the Duars of North Bengal. In order to throw light on the problematical passage of the plasmodium through the placental barrier, a pregnant *rhesus* monkey near its full term was inoculated with *P. knowlesi*. It died: there was no evidence of the passage of parasites into the foetal circulation. *N. W.*

GINGOLD (N.) & FLORESCO (P.). Sur quelques éléments de diagnostic dans les syndromes abdominaux aigus dus au paludisme. [**Points of Diagnostic Significance in Acute Abdominal Symptoms caused by Malaria.**]—*Bull. Acad. Méd. Roumanie.* 1939. 4th Year. Vol. 7. No. 2. pp. 68–76. [13 refs.]

The authors describe two cases of acute malaria in which the symptoms simulated those of acute appendicitis. Reference is made to many similar cases reported in the literature during recent years [see also this *Bulletin*, 1938, Vol. 35, p. 812]. Occasionally diagnostic difficulties are considerable. In cases in which the symptoms are due to malaria there are often sudden variations in the patient's general condition, and in subjective and objective symptoms, from hour to hour, such as are never observed in the acute abdominal affections which are simulated. Observations of temperature and pulse should be made four or five times a day. In acute abdominal conditions demanding surgical intervention constipation is the rule: in malarial cases the stools are often normal or there may be diarrhoea. In malarial cases pain occasioned by superficial palpation is very acute, sometimes more acute than that caused by deep palpation. The disappearance of symptoms after the administration of quinine or plasmoquine is of course of diagnostic significance. If the patient's condition justifies the postponement of surgical intervention this method of arriving at a diagnosis should be attempted. The mere existence of symptoms of malarial infection does not preclude the possibility of the coexistence of an acute surgical abdomen.

The authors agree that there is no specific lesion responsible for these symptoms, which are caused by the obstruction of capillaries by the detritus of parasites and pigment, giving rise to congestion. *N. W.*

CHATTERJEE (S. C.). **Urticaria in Malarial Infection.**—*Calcutta Med. Jl.* 1939. Apr. Vol. 35. No. 4. pp. 291–293.

Three cases of malaria are described, one subtertian and two benign tertian, in which urticaria was a constant accompaniment of the fever, subsiding when the temperature fell. Fever and urticaria alike responded to quinine therapy. The author considers it probable that the urticaria is the allergic response to the protein of broken down red cells in persons sensitized by previous infections. *N. W.*

CHUB (G. M.) & PANFEROVA (E. A.). Réaction de mélanofloculation Henri en présence du paludisme expérimental. [**Henry's Reaction in Experimental Malaria.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1938. Vol. 7. No. 6. [In Russian pp. 793–799. With 3 charts. [35 refs.] French summary p. 800.]

In 41 cases of *P. vivax* malaria, infected experimentally by mosquitoes, with incubation periods ranging from 264 to 381 days, it was found that Henry's reaction remained persistently negative throughout these very prolonged incubation periods. Positive reactions were only obtained after the onset of clinical symptoms, fever and the appearance of parasites in the peripheral blood.

N. W.

SCOTTI (Giuseppe). Sierodiagnosi di Wright e malaria. [**Agglutination Reaction and Malaria.**]—*Arch. Ital. Sci. Med. Colon. e Parassit.* 1939. Mar. Vol. 20. No. 3. pp. 133–144. [11 refs.] [Summary appears also in *Bulletin of Hygiene.*]

The observation that the serum of a patient with malaria gave a positive agglutination reaction with *Brucella melitensis* prompted the author to examine a hundred cases of malaria from this point of view. Positive reactions were obtained in a large number of cases and with different strains of Brucella. The results are summarized in table II of his paper :—

Percentage of positive agglutinations obtained with different strains of Brucella with varying dilutions of serum of malaria patients.

Strain of Brucella	Dilution of Serum			
	1 : 100	1 : 200	1 : 400	1 : 800
	Percent.	Percent.	Percent.	Percent.
Br. melitensis Arkwright	25	11	6	6
,, ,, Caprino	4	2	1	1
,, ,, H 26	0	0	0	0
,, ,, Zammit	12	21	8	16
,, *paramelitensis* Bassett-Smith...	17	24	9	15
,, *abortus* Bang	0	0	0	0

N. W.

SÃO PAULO (Fernando). Tratamento do paludismo. [**Treatment of Malaria.**]—*Hospital.* Rio de Janeiro. 1939. Apr. Vol. 15. No. 4. pp. 667–688.

This is a lecture on the treatment of malaria from the clinical point of view. Most, if not all, of the specific and "paraspecific" remedies that have been used in the treatment of this disease are dealt with, and the symptomatic treatment of the complications and sequelae of malaria receive attention. *N. W.*

FEDERATED MALAY STATES. ANNUAL REPORT OF THE INSTITUTE FOR MEDICAL RESEARCH FOR THE YEAR 1937 [KINGSBURY (A. Neave), Director]. [**Malaria.** pp. 96–106 & 147–148. NIVEN (J. E.), Acting Malaria Research Officer.]

The results of experiments on estates to determine the relative value of atebrin and quinine in clinical prophylaxis, in accordance with a programme drawn up by the Malaria Commission of the League of Nations, have been published [see this *Bulletin*, 1938, Vol. 35, p. 36]. On one of these estates, surrounded by swampy jungle where there is uncontrolled anopheline breeding, the suspension of drug administration for eight weeks was responsible for a sharp rise in the number of malaria attacks. Drugs were readministered, the former atebrin group receiving quinine, and the former quinine group atebrin. The adult doses were atebrin 0·3 gm. once a week, quinine bihydrochloride 1 gm. once a week. Atebrin in this dose was effective in suppressing

clinical malaria : the dose of quinine was too small. In the atebrin group there was a marked reduction in the number of gametocyte carriers, particularly among benign tertian cases. Suspension of drug prophylaxis, after 13 months' administration, was once more followed by a markedly increased incidence of clinical malaria.

In another estate atebrin 0·3 gm. was given fortnightly and then at ten-day intervals. This dose is not completely effective. The conclusion is reached that 0·3 gm. weekly is the minimum effective prophylactic dose of atebrin for adults.

In the General Hospital, Kuala Lumpur, 134 subtertian and 70 benign tertian cases were treated with totaquina, the quinine treated controls numbering 129 and 73 respectively. All these test cases had not less than 1,000 asexual parasites per cubic millimetre of peripheral blood. There is no significant difference between the two drugs in rapidity of action in destroying parasites or in reducing fever. Neither is an efficient subtertian gametocide. Two grammes a day was considered to be the optimum dose of totaquina, for adults.

Five cases of benign tertian malaria were treated with a proprietary remedy " homaline I " : three of them required quinine treatment before the end of a week.

Paludex was found to be inefficient as a remedy for acute infections with the Malayan strains of *P. falciparum.*

Prontosil, 0·9 gm. a day, was given to a few cases, without success.

N. W.

CASINI (G.). Tre anni di profilassi e terapia della malaria a Posada (Sardegna). [**Three Years of Malaria Prophylaxis and Therapy in Posada (Sardinia).**]—*Riv. di Malariologia.* Sez. I. 1939. Vol. 18. No. 1. pp. 1–16. English summary.

In 1935 an experiment was carried out in Posada, Sardinia, a small town of 780 inhabitants, intensely malarious, to determine the value of atebrin as a prophylactic. This was a contribution to the inquiry which the Malaria Commission of the League of Nations was undertaking, and the results were duly reported [see this *Bulletin*, 1938, Vol. 35, pp. 28–29]. The experiment was continued during the two following years with certain modifications : in 1936–37, 277 individuals received atebrin twice a week, same doses as before, and 312 received quinine, adult dose 0·80 gm. twice a week, and the administration was continued throughout the year and not confined to the epidemic period as in the first year. About 200 persons refused treatment. In the epidemic period of 1937, May to October, quinine was given three times a week, atebrin twice a week as before. Cases of malaria were treated with the drug used as a prophylactic, atebrin 7 days' treatment, quinine 15 days' treatment. Blood examinations of all persons were made once a month.

No toxic symptoms were experienced. Bi-weekly administration of atebrin is effective ; the number of fever cases in the atebrin groups was 40 among 244 in the first year ; 16 among 277 in the second year, and 4 among 175 in the third year (May to October only). Febrile cases in the quinine groups numbered 47 out of 312 in 1936–37, and 78 out of 391 in the epidemic season of 1937.

Benign tertian cases were very rare in both groups ; atebrin was much more effective than quinine in preventing malignant tertian

fever. The spleen and parasite indices in March 1935 were 78·7 and 21·6 per cent. ; in March 1937 they were 37·4 and 7·6 per cent. The general conclusion is reached that by atebrin or quinine prophylaxis, especially if this be continued through the inter-epidemic period, accompanied by prompt treatment of all febrile attacks, it is possible to reduce malaria symptoms, spleen rates and parasite rates, and to effect a marked improvement in the health of a population, but it is not possible by these means to eradicate malaria. *N. W.*

RASHINA (M. G.) & KHOVANSKAYA (A. I.). Essai d'assainissement d'un foyer paludique (vil. Khamidié en Kabardino-Balkarie) uniquement au moyen d'un traitement médicamenteux (acriquine et plasmocide). [**Attempted Control of Malaria in the Town of Khamidié by Administration of Acriquine and Plasmocide.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1939. Vol. 8. No. 1. [In Russian pp. 9–23. With 2 figs. [16 refs.] French summary pp. 23–24.]

The town of Khamidié has a population of 2,000. In the spring of 1935 when these observations commenced the parasitic, splenic and endemic indices were 44·4, 44·7 and 63·7, respectively. Irrigation canals are responsible for most of the anophelines which are active for only five months in the year. During each of the years 1935–37 a medical inspection of the whole population was carried out in spring and summer and autumn. All persons found harbouring malaria parasites were treated. In the spring all those who had suffered from malaria in the previous year were treated (acriquine 0·1 gm. three times a day for five days, with plasmocide 0·03 gm. twice a day on the first and third day of treatment). All acute cases were treated in the same manner ; in 1937 the period of treatment was extended to seven days. During the transmission season all persons who had had malaria were given plasmocide 0·03 gm. twice a day, on the first and fourth day of six-day cycles. The total number of malaria cases in the three years, primary cases, reinfections and relapses, were 661, 438 and 233 respectively. Of infants under two years of age the percentage that suffered from malaria in the three years was, 50·4, 17·4 and 4·3 respectively. The results have thus been considerable. In view of the close contact between the population and a very active vector complete control will necessitate the adoption of anti-mosquito measures in addition to the drug treatment. *N. W.*

BAEZA (J. I.). **Partial Control of Malaria in a Localized Area by Plasmoquine.**—*Jl. Malaya Branch Brit. Med. Assoc.* 1939. Mar. Vol. 2. No. 4. pp. 239–243.

In an outlying part of Perak a community of 160 persons suffered severely from malaria. Anti-larval measures were not practicable. Plasmoquine as a prophylactic was given twice weekly, 0·02 gm. to those over the age of three, half that dose to those of lesser age. The general improvement of health that followed was marked. At the preliminary survey in October 1935 the spleen rate was 17·8 per cent., the parasite rate 18·6 per cent. and the average haemoglobin rate

64 per cent. These rates in July 1937 were 4·3, 5·1 and 72·3 respectively. The spontaneous gratitude of the people of the settlement is testimony to the value of the results achieved. *N. W.*

DUPOUX (Robert), BARTHAS (Raymond), ANTOINE (Albert) & GARALI (M. Tahar). Nouveaux résultats des expériences de prophylaxie collective antipaludique en Tunisie. [**Recent Results of Experiment in Collective Antimalarial Prophylaxis in Tunis.**]—*Bull. Acad. Méd.* 1939. Apr. 25. 103rd Year. 3rd Ser. Vol. 121. No. 15. pp. 591–595.

The early results obtained by the mass distribution of premaline in the Cape Bon peninsula in Tunis have already been reported [see this *Bulletin*, 1938, Vol. 35, pp. 566–567]. This communication records the results obtained in 1937 and 1938. As before distribution of premaline was made twice each month from the 1st June to the 1st November. Those found harbouring parasites, chiefly nomads visiting the district, were given a curative treatment with premaline. The number of persons receiving prophylactic treatment was 27,126 in 1937 and 26,906 in 1938. No anti-mosquito measures were undertaken. The results achieved are most remarkable. In May 1936 the parasite index was 21·9 for children and 17·6 per cent. for adults. In November 1936, after the epidemic season, these indices had fallen to 3·5 and 2·5. In the two following years the general parasite indices were 4·3 and 0·76, and 1·8 and 0·1, determined in the same months. The fall in the splenimetric indices was almost more striking—1936, May 67·0, November 33·4; 1937, May 25·8, November 12·9; 1938, May 9·9, November 1·3. It is true that the winter of 1937–38 was unusually dry but anophelines were still prevalent and malaria continued to be severe in untreated areas which served as controls. Moreover the deficient rainfall increased the immigration of nomads coming from the south who were heavily parasitized. No death was attributed to malaria in the region treated. The only cases of malaria occurred among arrivals from adjacent areas. Patients treated with premaline and subsequently submitted to the bi-monthly administration of the drug suffered no relapses. During the three years' experience no toxic symptoms have been caused by the drug. The annual cost per person treated was 13·81 fr. in 1937 and 15·26 fr. in 1938. *N. W.*

NIVEN (J. C.). **Sulphanilamide (Prontosil) in the Treatment of Malaria.** —*Bull. Inst. Med. Res. Federated Malay States.* 1938. No. 4. 27 pp. With 6 graphs.

Eighty cases of acute malaria were treated with prontosil, and 68 cases with quinine bihydrochloride. The patients were adult Chinese or Indian, of the labouring class. All cases had temperatures of over 99°F. and more than 1,000 asexual parasites per cmm. of the peripheral blood. Of the sulphanilamide cases 34 were infected with *P. falciparum*, 38 with *P. vivax*, and 8 with *P. malariae*. Prontosil album (Bayer) was used, 3 gm. daily in two doses; the quinine was given in a dose of 2 gm. per 100 lbs. body weight a day. Both drugs were given for 7 days.

Prontosil has some lethal action on plasmodia but it is much less efficient than quinine. It is more active against *P. falciparum* than against *P. vivax*. It is not an efficient gametocide either in *P. falciparum* or *P. vivax* malaria. Mosquitoes fed on 5 prontosil treated

crescent carriers at the end of the course of treatment were readily infected. No toxic effects resulted from the use of prontosil. The conclusion is reached that prontosil is not a practical addition to the therapeutic armament against malaria ; it is much less efficient than quinine, is more dangerous and much more costly. *N. W.*

NIVEN (J. C.). **Paludex in the Treatment of Subtertian Malaria.**—*Bull. Inst. Med. Res. Federated Malay States.* 1938. No. 3. 13 pp. With 3 charts.

Ninety-one cases of subtertian malaria in the General Hospital, Kuala Lumpur, are the subject of report ; 29 received paludex alone, 30 paludex and quinine bihydrochloride, and 32 quinine bihydrochloride alone. The dose of paludex given was 1·5 gm. a day and of quinine 2 gm. per 100 lbs. body weight. It was found that paludex is much less efficient that quinine in controlling fever and eliminating parasites from the peripheral blood. Paludex does not affect the viability of subtertian gametocytes. There is no significant difference between the effects of the combination paludex and quinine and those of quinine alone. Paludex is not an efficient remedy for infections with the local strains of *P. falciparum.* *N. W.*

DECOURT (Ph.), BELFORT (J.) & SCHNEIDER (J.). Etude de l'action de l'oxy(diméthylaminobutylamino)quinoléine sur *Plasmodium gallinaceum* et *Plasmodium falciparum.* [**Action of Cilional on** *P. gallinaceum* **and** *P. falciparum.*]—*Bull. Soc. Path. Exot.* 1939. Apr. 4. Vol. 32. No. 4. pp. 419–424.

Oxy(dimethylaminobutylamino)quinoline belongs to the same chemical series as does plasmoquine : a salt containing 40·03 per cent. of active base has received the designations cilional and certuna [see this *Bulletin*, 1938, Vol. 35, pp. 562–564]. The authors summarize published reports on the value of this drug as a gametocide and describe their own observations. These were carried out on chickens infected with *P. gallinaceum* and on patients harbouring gametes of *P. falciparum.* The human experiments were made in a highly malarious town in Tunisia, in March and April before the beginning of the transmission season. The nine patients selected showed gametes of *P. falciparum* each day during an eight-day period of observation. Eight patients each received 0·01 gm. of cilional thrice daily for five days ; the last patient received double these doses. At the end of treatment two patients out of eight still harboured gametes, fifteen days later five out of eight, and after five weeks all were positive. The treatment was repeated with double doses with still less satisfactory results. There were no signs of drug intolerance and there was an improvement in the general condition.

The authors conclude that cilional is less effective than either praequine or rhodoquine. Its use has been advocated for the reason that it is less toxic than plasmoquine. They point out that rhodopraequine, which has been so little used by other than French workers, is quite as active as praequine, and has never to their knowledge given rise to alarming symptoms. *N. W.*

FARINAUD (M. E.). Un exemple d'assainissement par méthode mixte sur la plantation de N. [**Improvement of Health Conditions on a Plantation effected by Multiple Measures.**]—*Rev. Méd. Française d'Extrême-Orient.* 1939. Jan. Vol. 24. No. 1. pp. 1–12. With 1 fig., 1 plan & 1 chart.

This is the story of a plantation which was intensely malarious and which has required twelve years of persistent effort and the superimposition of several measures to bring morbidity and mortality rates therein to reasonable dimensions. The plantation is situated on flat land in the immediate vicinity of important rivers, the Song-La-Buong and its tributaries. Mosquito prevalence was enormous: 34 per cent. of the total catches were anophelines of the Myzomyia group, *minimus*, *aconitus* and *jeyporiensis*, all dangerous vectors. *A. minimus* was much the most prevalent of the three. The unhealthiness of the estate is exemplified by the fact that between 1927 and 1930 it was necessary to recruit 1,200 coolies to maintain a labour force of 550.

An interesting account is given of the successive measures tried, including quinine prophylaxis, antilarval measures, chiefly oiling and cleaning the edges of water courses as drainage was out of the question, mass administration of quinacrine, praequine, and finally premaline, fumigation, the installation near villages of buffalo stables to attract anophelines, spraying the lines with Shell-tox. At long last the mortality from malaria has been almost eliminated. Anophelism, malaria morbidity and the general death rate have all declined in a remarkable manner, although it has been impossible to eliminate the anopheline vectors. The spleen and parasite rates of children in 1929 were 100 and 78·5 per cent.: in January 1939, they were 6·89 and 17·24 per cent. *N. W.*

SATTA (Ernesto). Sopra il potere antilarvale dell' esacloroetano. [**Antilarval Potency of Hexachlorethane.**]—*Rendiconti Istituto di Sanitá Pubblica.* Rome. 1938. Vol. 1. Pt. 3. pp. 885–892.

The use of hexachlorethane as a mosquito larvicide has been described by MAY [this *Bulletin* 1937, Vol. 34, p. 172]. The author describes certain experiments with this preparation from which he concludes that hexachlorethane is unlikely to prove of much practical value as a larvicide. *N. W.*

HOLMES (W. E.). **The Adult Anopheles Survey as a Routine Anti-Malarial Measure.**—*Jl. Malaya Branch Brit. Med. Assoc.* 1939. Mar. Vol. 2. No. 4. pp. 213–218. With 1 folding map.

In spite of permanent anti-malarial work extending at least half a mile from any inhabited part of the west-central part of Kuala Lumpur endemic malaria in that sector is an annual occurrence. These outbreaks were caused by *A. maculatus* breeding at least a mile away. By the use of human bait traps it is possible to obtain timely notice of the infiltration of mosquitoes over these long distances. Routine Anopheles trapping at fixed points is an essential part of a control scheme: it allows of earlier extension of larval control than would be otherwise possible. The author describes in detail the use of such traps in Kuala Lumpur and their utility. *N. W.*

TRYPANOSOMIASIS.

Précis of Abstracts in this Section.

Horner (p. 138) found that the complement titre of the blood of guineapigs infected with trypanosomes is greatly reduced during the periodic crises which are a feature of the disease in these animals, when the numbers of trypanosomes become reduced. This is probably due to an *in vivo* antigen-antibody reaction. Acanfora (p. 138) observes that after subcutaneous injection into guineapigs of blood containing *T. brucei* the majority of the trypanosomes pass to the lymphatic glands where they are destroyed. Bone marrow apparently also has a constant action in suppressing the infection.

van den Branden (p. 138) failed to observe any notable influence on the course of infection or on the morphological appearances of the trypanosomes in white rats infected with *T. brucei* and maintained in the cold at 4°C. to 5°C.

Roubaud and Provost (p. 139) have infected rabbits with *T. viennei* (*T. guyanense*). They conclude that differentiation of this strain from *T. vivax* is no longer legitimate from any point of view.

Chagas's disease.—Nowicki (p. 139) shows that *T. cruzi* may remain infective for 2–3 days in post mortem material, but *T. congolense* and *T. equinum* usually fail to infect on the day following death of the animal. Leishmaniform stages of *T. cruzi* remain viable for 12 days in heart muscle or spleen removed from rats at the height of infection and kept in sealed tubes of buffered Ringer or Locke solution (Kolodny p. 140).

Denecke and von Haller (p. 140) in 52 careful experiments failed to induce infection by the bite of infected bugs. Brumpt (p. 140) discusses the mode of infection in Chagas's disease. The usual method is by the faeces of the bug, but it is possible, as was originally suggested by Yorke, that occasionally the infection may be introduced during the act of biting by means of the contamination of the biting parts of the bug with faeces.

Talice and Osimani (p. 141) found a dog and three cats naturally infected with *T. cruzi* in Fray Bentos. Brumpt *et al.* (p. 141) and Lent and Pifano (p. 142) give lists of vectors and animals naturally infected with *T. cruzi* in Mexico. Packchanian (p. 142) reports that *Triatoma gerstakeri* has been found naturally infected with *T. cruzi*. Mazzotti (p. 142) reports another naturally infected species, which has not yet been named.

Romaña (p. 143) finds that by the precipitin test the blood ingested by *R. prolixus* and *T. infestans* can be recognized after 30 days.

Pessôa and de Barros (p. 143) give details of the duration of evolution of *T. infestans* at different temperatures.

Kolodny (p. 143) reports interesting work in which he has demonstrated that immune bodies are present in the milk of rats which have recovered from *T. cruzi* infection or which have been passively immunized by injection of immune rat serum. Partial and temporary immunity is passed to the young through the milk, but not to any effective extent through the placenta, and the intestine of the young is permeable to these bodies for about 20 days after birth. The immunity is specific.

Talice (p. 144) gives clinical details of a case of Chagas's disease, and with other workers (p. 145) describes seven patients in whom diagnosis

was confirmed by xenodiagnostic methods. HERR and BRUMPT (p. 146) report accidental infection of the eye by the faeces of *T. pallidipennis* (from Mexico where the disease is unknown) in Paris. Xenodiagnosis confirmed the clinical diagnosis and a new drug Bayer 7602 was used in treatment. *C. W.*

HORNER (Imre). **Studies on Serum Complement of Guinea Pigs infected with** *Trypanosoma equiperdum.*—*Jl. Immunology.* 1939. Aug. Vol. 37. No. 2. pp. 85–89.

Trypanosomal infections in the guineapig run a relapsing course, and the most plausible explanation is that the crises are caused by a lytic substance. The experiments recorded in the present paper are intended as a contribution to knowledge regarding the mode of function of this antibody.

The complementary titre of the serum of infected guineapigs was observed repeatedly during the course of the disease. When trypanosomes were numerous or were increasing in the blood, the titre remained stationary up to the peak of multiplication. At the trypanosomal crisis the complement titre dropped to 1/3 or 1/4 of its previous value, but within a few days it returned to the normal level, where it remained throughout the next cycle of multiplication of the parasites.

It was found that only the middle-piece component was deficient in the complement-poor serum. The author believes that the loss of complement is due to an *in vivo* antigen-antibody reaction, pointing to the existence of a trypanolytic antibody. *W. Yorke.*

ACANFORA (G.). La *Castellanella brucei* durante le prime fasi dell' infezione sperimentale. [*Trypanosoma brucei* **during the Early Stages of Experimental Infection.**]—*Arch. Ital. Sci. Med. Colon. e Parassit.* 1939. May. Vol. 20. No. 5. pp. 257–272. With 13 figs. [10 refs.]

In a study of the early phases of *Trypanosoma brucei* infection in the guineapig it is found that after subcutaneous injection of infected blood of another animal some of the injected trypanosomes find their way into the blood either by active penetration of the capillary walls or by simple passage through lesions in vessel walls, but the majority pass to the lymphatic glands where they are destroyed. Degenerating forms of trypanosomes can be seen in smears of the glands receiving lymphatics from the inoculation site. The glands thus offer a barrier to the invasion of the blood. Similar results follow intraperitoneal injections, whereas after intravenous injection the lymphatic glands do not appear to play any part in controlling the infection. During all stages of the infection smears of the bone marrow, particularly that of the long bones, show many degenerating trypanosomes, so that it would seem that the bone marrow has a constant action in suppressing the infection. *C. M. Wenyon.*

VAN DEN BRANDEN. Influence du froid sur l'évolution de la trypanosomiase expérimentale du rat blanc infecté de *Trypanosoma brucei.* [**The Influence of Cold on the Evolution of** *T. brucei* **Infections of White Rats.**]—*Ann. Soc. Belge de Méd. Trop.* 1939. June 30. Vol. 19. No. 2. pp. 243–244.

In 1908, BRUMPT studied the action of cold on a dormouse infected with *T. gambiense.* The animal, after inoculation, was put in a cellar

in order to hibernate. When it was withdrawn 24 days later the blood was negative. In the meantime, the control animals had died of the infection. The dormice cured by hibernation did not acquire immunity, as they succumbed to a second inoculation. Brumpt considered the disappearance of the trypanosomes in the hibernating animals to be due in part to a diminution in the vitality of the trypanosomes under the influence of low temperatures, and in part to a normal conservation of the physiological functions of the phagocytes. The destruction of the parasites exceeded their reproduction at low temperatures and the animal was cured.

van den Branden decided to re-investigate the matter with a strain of *T. brucei* in white rats. He had observed a survival of the inoculated rats during a period of frost in December 1938. In order to go further into the matter, he put infected white rats into an ice-box at a temperature of 4 to 5°C. The control animals were kept in a warm stable, where the temperature ranged from 18 to 20°C. during the day to 10 to 12°C. at night. The course of the disease in animals kept in the ice-box was prolonged from 5 to 7 days. Subinoculation from these animals into normal animals kept in the warm stable produced the usual type of infection. No morphological change could be discovered in the trypanosomes found in the blood of the animals exposed to cold. The only effect of cold appeared to be a slight prolongation of the duration of the infection. van den Branden believes that the explanation is that under the influence of cold the resistance of the rat increases to a slight extent. *W. Y.*

ROUBAUD (E.) & PROVOST (A.). Sensibilité du lapin au trypanosome des ruminants des Antilles *Tr. viennei*, souche américaine de *Tr. cazalboui* (*vivax*). [**The Susceptibility of the Rabbit to the Trypanosome of Ruminants of Antilles** *T. viennei*, **American Strain of** *T. cazalboui* (*vivax*).]—*Bull. Soc. Path. Exot.* 1939. May 10. Vol. 32. No. 5. pp. 553–559. With 3 figs.

The authors refer in some detail to the work of BLACKLOCK and YORKE (1913) who succeeded in infecting rabbits with a strain of *T. vivax* isolated from a horse infected in the Gambia. They themselves repeated these experiments, using the American strain *T. viennei* (*T. guyanense*), and obtained results similar to those obtained by Blacklock and Yorke; they conclude, therefore, that the differentiation of these parasites from *T. vivax* no longer appears legitimate from any point of view.

W. Y.

NOWICKI (E.). Postmortales infektionsfähiges Ueberdauern von *Schizotrypanum cruzi*, *Trypanosoma congolense* und *Trypanosoma equinum* in Versuchstierorganen. [**The Duration of Post-Mortem Infectivity of** *T. cruzi*, *T. congolense* **and** *T. equinum* **in the Host's Organs.**]—*Zent. f. Bakt.* I. Abt. Orig. 1939. May 12. Vol. 143. No. 7/8. pp. 385–392.

The author has examined the post-mortem survival in various organs, as judged by capacity to infect other animals, of *T. cruzi*, *T. equinum* and *T. congolense*. He found that *T. cruzi* in the mouse can survive with certainty two days and sometimes three days after death; the best organ is the brain. After one day animals inoculated from all organs (liver, spleen, heart muscle and brain) became infected,

but the most rapid infection was obtained from heart muscle. *T. congolense* and *T. equinum* material from dead rats as a rule failed to infect, even a day after death, and storing the organs at low temperature did not increase the survival period. Details of the experiments are given and the results are summarized in tables. *W. Y.*

KOLODNY (Maxwell H.). **A Method for the Preservation of Viable Forms of** *Trypanosoma cruzi*. [Research Notes.]—*Jl. Parasitology.* 1939. June. Vol. 25. No. 3. p. 282.

This note describes a simple method for a short term preservation of the viable forms of *T. cruzi*. When young rats of less than 20 days old are inoculated with *T. cruzi* they suffer an extremely intense and fatal infection. Intensity of blood infection is paralleled by extensive somatic invasion, particularly of the heart muscle and spleen. It was found that when either of these organs is removed during the peak of the blood stream infection, or immediately after the death of the animal, the leishmaniform stage of the parasite will remain viable for 12 days when kept in a sealed tube of buffered Ringer's or Locke's solution, at either refrigerator or room temperature. *W. Y.*

DENECKE (Karl) & VON HALLER (Ernst). Recherches expérimentales sur le mode de transmission et le cours de l'infection par *Trypanosoma cruzi* chez les souris. [**Experimental Researches on the Mode of Transmission and the Course of Infection of** *T. cruzi* **in the Mouse.**]—*Ann. Parasit. Humaine et Comparée.* 1939. July 1. Vol. 17. No. 4. pp. 313–319.

In spite of the numerous researches which have been conducted on the mode of transmission of *T. cruzi*, there is still a diversity of opinion. BRUMPT (1939) and CARDOSO (1938) have recently summarized the different points of view [see this *Bulletin*, 1939, Vol. 36, pp. 753, 228]

The authors have once again returned to the subject, with a view to ascertaining whether infected Reduviids are capable of transmitting the trypanosomes to white mice solely by biting and sucking blood. They describe in considerable detail an ingenious technique in order to exclude any possibility of the infected faeces of the bugs reaching the skin of the mouse. No less than 52 experiments were conducted and in none of them did the bite of the infected bug suffice to produce infection. Certain details are given regarding differences in the course of the infection in mice produced by various Mexican strains of the parasite. *W. Y.*

BRUMPT (E.). Mode de transmission de la maladie de C. Chagas. [**Method of Transmission of Chagas's Disease.**]—*Ann. Parasit. Humaine et Comparée.* 1939. July 1. Vol. 17. No. 4. pp. 320–331. With 3 figs. [45 refs.]

Brumpt reviews this question in great detail. He points out that so long ago as 1912 he showed that a *Cercopithecus ruber*, which had resisted numerous bites of *Triatoma megista*, developed a fatal infection after the deposit of the infected excreta on the ocular mucosa. He also draws attention to the frequency of oedema around the eye as one of the first signs of the acute form of Chagas's disease.

After referring to the fact that CHAGAS in 1909 and 1911 had advanced the view that the infection was transmitted by the bite of the bug,

Brumpt summarizes the somewhat voluminous literature bearing on these two hypotheses. Whilst the great mass of observers support Brumpt's hypothesis, certain workers, notably MÜHLENS, DIOS, PETROCCHI and ZUCCARINI [this *Bulletin*, 1927, Vol. 24, p. 682] and CARDOSO [this *Bulletin*, 1939, Vol. 36, p. 228] have reported that they succeeded in infecting mice by the bites of infected bugs after taking all precautions to avoid contamination by the bug's faeces. Brumpt recalls that DIAS, and later HOARE [this *Bulletin*, 1934, Vol. 31, p. 757] attempted to explain the observation of Mühlens and his collaborators on the theory that the trypanosomes had regurgitated into the biting parts from the intestine of the bug.

In a summary of Cardoso's paper, the reviewer suggested that Cardoso's positive result might be explained by a contamination of the biting parts of the bug by the infective faeces of itself or another bug. Brumpt examines this hypothesis in detail. He points out that cannibalism is common, and that it is interesting to note that Mühlens and his collaborators, and Cardoso, succeeded in infecting only a single animal, and that when they later tried to obtain infections from the bites of the same bugs they failed, and that finally DENECKE and VON HALLER [*vide* above] who took the most careful precautions to avoid contamination of the mouth parts by the infective excreta, failed in a long series of experiments to obtain a single infection by means of the bite.

In conclusion, Brumpt considers that the reviewer's hypothesis is well founded and is probably the correct explanation of the occasional infections which have been obtained experimentally through the bites of infected bugs. *W. Y.*

TALICE (R. V.) & OSIMANI (J. J.). Primeros mamíferos domésticos infectados por el *T. cruzi* comprobados en Fray Bentos. [**Infection by *T. cruzi* of Domestic Animals in Fray Bentos.**]—Reprinted from *An. Facul. de Med.* Montevideo. 1939. Vol. 24. Nos. 11 & 12. 6 pp. [37 refs.]

The authors record the existence in Fray Bentos, the capital town of the Rio Negro Department, of a dog and three cats which they found naturally infected with *T. cruzi*. The inhabitants denied that the houses were infected with bugs, but investigation proved this to be erroneous. *H. H. S.*

BRUMPT (E.), MAZZOTI (Luis) & BRUMPT (L. C.). Enquêtes épidémiologiques sur la maladie de C. Chagas au Mexique. Réduvidés vecteurs. Animaux réservoirs de virus. Cas humains. [**Epidemiological Inquiries on Chagas's Disease in Mexico. Reduviid Vectors, Animal Reservoirs and Human Cases.**]—*Ann. Parasit. Humaine et Comparée.* 1939. July 1. Vol. 17. No. 4. pp. 299–312. With 1 chart & 10 figs. on 5 plates. [23 refs.]

Although the authors' work since 1932 has appeared to show that American trypanosomiasis does not exist in Mexico, recent researches have shown that the disease, although mild, is probably widely extended. The authors state that in Mexico there are 11 species of Triatoma and one species of Rhodnius. They have examined the most common of these, and have found natural infections in *T. barberi*, *T. dimidiata*, *T. pallidipennis*, *T. phyllosoma*, *T. rubida* and *Rhodnius prolixus*.

Details are given of two human cases of the disease discovered in Mexico, and of an accidental infection with the Mexican parasite in Brumpt's laboratory in Paris.

The only animal reservoirs of the virus actually discovered in Mexico are the dog and an armadillo. A rodent *Neotoma* (*Hodomys*) *alleni*, the burrows of which contain numerous infected *T. pallidipennis*, is certainly an important reservoir, and probably there are many others.

W. Y.

LENT (Herman) & PIFANO (Félix). "Eutriatoma nigromaculata" (Stal, 1872) N. Comb., especie venezuelana encontrada infestada pelo "Schizotrypanum cruzi" (Chagas, 1909). Nota prévia. [*Eutriatoma nigromaculata*, **a Venezuelan Species naturally infected with** *T. cruzi*.]—*Brasil-Medico*. 1939. July 1. Vol. 53. No. 27. pp. 685–686. With 1 fig.

The authors state that the species of Triatomidae found infected in nature by *T. cruzi* amount to twenty; they name ten of these: *Triatoma rubrofasciata*, *T. dimidiata*, *Panstrongylus geniculatus*, *Eutriatoma maculata*, *Rhodnius prolixus*, *R. pictipes*, *Eratyrus cuspidatus*, *Belminus rugulosus*, *Psammolestes arthuri* and *Eutriatoma nigromaculata* which the authors themselves have discovered so infected and, as they intend to publish in a future paper, capable of transmitting Chagas's disease experimentally. Of these ten there are four more often met with than the others, *viz.*, *R. prolixus*, *E. maculata*, *P. geniculatus* and *Ps. arthuri*.

H. H. S.

PACKCHANIAN (Ardzroony). **Natural Infection of** *Triatoma gerstakeri* **with** *Trypanosoma cruzi* **in Texas.**—*Public Health Rep.* 1939. Aug. 25. Vol. 54. No. 34. pp. 1547–1554. With 10 plates. [15 refs.]

This note records a natural infection of *Triatoma gerstakeri*, collected at Three Rivers, Texas, with *T. cruzi*. Of 100 bugs examined, 92 were found to be naturally infected with flagellates. A number of animals were inoculated with the trypanosomes and a description is given of the parasites in these animals.

The article, which is illustrated by 10 plates, contains nothing new, apart from the finding of the naturally infected *Triatoma gerstakeri*.

W. Y.

MAZZOTTI (Luis). Infección natural por Trypanosoma Cruzi en otra especie de Triatoma. [**Another Species of Triatoma found naturally infected by** *Trypanosoma cruzi*.]—*Medicina*. Mexico. 1939. June 25. Vol. 19. No. 342. pp. 197–199. With 2 figs. English summary (9 lines).

During the past three years five species of bug have been found in Mexico naturally infected with *T. cruzi*, viz.: *Triatoma phyllosoma*, *T. pallidipennis*, *T. dimidiata*, *T. rubida* and *Rhodnius prolixus*. In March 1939 the author found another species of Triatoma naturally infected in Trapiche, a town in the Nayarit State. It is illustrated in the paper, but no detailed description is given and no specific name has yet been given to it.

H. H. S.

ROMAÑA (C.). Utilisation de la méthode des précipitines pour l'identification du sang ingéré par certains réduvidés. [**Identification of the Blood Meals of Reduviids by Precipitin Tests.**]—*Bull. Soc. Path. Exot.* 1939. June 14. Vol. 32. No. 6. pp. 625–628.

The author has tested on *Rhodnius prolixus* and *Triatoma infestans* the precipitin method for identifying the blood meals of insects. The precipitating antisera were prepared from rabbits by Wolfe's rapid method. Under experimental conditions the blood could be recognized as late as 30 days after feeding. The method has not yet been applied in the field. *V. B. Wigglesworth.*

PESSÔA (S. B.) & DE BARROS (Nelson V.). Creação do *Triatoma infestans* na temperatura de estufa. [**Rearing** *Triatoma infestans* **at 37°C.**]—*Folha Med.* 1939. June 25. Vol. 20. No. 18. pp. 285–287.

The xenodiagnostic method is important in obscure cases of Chagas's disease and for this purpose it is best to use bugs in the 3rd or 4th moults. The average duration of evolution at the air temperature of São Paulo is given as follows: Egg to larva 25–30 days, 1st moult 45 days, 2nd 60–90 days, 3rd 120–180 days, 4th (nymph stage) 190 days, 5th (adult) 271 days; the total may be as long as 360 days. In the laboratory at room temperature the duration has been 300 days or less (220–240 days). Experimenting with two lots, one kept at room temperature and one at 37°C. (the larvae being allowed to feed once or twice a week on guineapigs), the latter reached the adult stage in an average of 99 days (minimum 94, maximum 105), by which time the former were coming to the end of the first moult only. A second lot developed in 111 days (108 and 114 minimum and maximum respectively), and a third lot in 109 (105 and 113), in other words in about half the time in which those kept at laboratory temperature developed —valuable saving of time where many may be needed for xenodiagnosis. *H. H. S.*

KOLODNY (Maxwell H.). **The Transmission of Immunity in Experimental Trypanosomiasis** (*Trypanosoma cruzi*) **from Mother Rats to their Offspring.**—*Amer. Jl. Hyg.* 1939. July. Vol. 30. No. 1. Sect. C. pp. 19–39. [17 refs.]

The author points out that there has been relatively little work concerning the transmission of active immunity against protozoan parasites. The work described in the present paper was designed to study the transmission of protective antibodies from mother rats actively immune to *Trypanosoma cruzi* to their offspring. The author gives the following summary of his work :—

"Mother rats actively immunized against *Trypanosoma cruzi* by recovery from infection with this parasite produce circulating protective antibodies which are transmitted to their offspring. In contrast to the recognized route of transmission in other hemochorial mammals, the transfer takes place principally by way of the colostrum and milk. This is indicated by the fact that normal young nursing upon immune foster mothers acquire an immunity about equal to that possessed by the young of immune mothers. Under the conditions of these experiments no evidence for placental transfer of antibodies could be found, as evidenced by the fact that the young born of immune mothers but placed immediately

after birth to nurse upon a normal foster mother were just as susceptible to infection with this parasite when tested at 4 hours, 1 day, 10 days, 12 days, and 20 days of age as were normal control animals of the same age.

"Mother rats passively immunized by the injection of specific rat antiserum against *Trypanosoma cruzi* are also able to transmit these protective antibodies to their young. These antibodies, sufficient in quantity to confer a high, though incomplete, degree of protection upon the young, are transmitted to them through the colostrum and milk. The placental barrier of the rat does not permit the passage of sufficient quantities of the antibodies to afford the young any measure of demonstrable resistance to infection with the homologous parasite.

"On the basis of these observations, it is suggested that the rat differs from other hemochorial mammals in that the principal route by which the type of protective antibody here considered is transferred from mother to offspring is through the colostrum and milk.

"The passive immunity acquired by young rats through the ingestion of milk from the immune mother and the absorption of antibodies therefrom is not sufficient to protect completely these animals from an infection with *T. cruzi* but will produce a mild and abortive infection and will generally prevent an otherwise fatal outcome.

"The immunity conferred upon the young by actively immune mothers is only temporary, and is demonstrable for at least 10 days after weaning. It decreases rapidly after that time.

"Protective antibodies are present not only in the colostrum but also in the milk throughout the normal period of lactation (20 to 25 days). The intestines of the young are permeable to these antibodies for about 20 days after birth.

"Protective antibodies can be demonstrated in the serum of the immune mother, and in the sera of immune and normal young nursing upon her. No antibodies demonstrable by protection tests were found in the sera of young born of immune mothers but nursing upon normal foster mothers for 25 days.

"The number of young in a litter definitely influences the degree of immunity acquired by each member of that litter. In general it may be said that the smaller the number of young in the litter, the greater will be the immunity acquired by each.

"It is suggested that the intensity of the infection suffered by the mother rat is reflected in the degree of immunity manifested by her young. It is also suggested that the ability of the immune mother to confer immunity upon the young diminishes with time after her recovery.

"The immunity against *Trypanosoma cruzi* conferred by actively immune mother rats upon their young is specific. It affords the young no protection against a closely related trypanosome, *T. lewisi*."

W. Y.

TALICE (Rodolfo V.). Sobre el primer caso de enfermedad de Chagas comprobado en el estado de Rio Grande del Sur (Brasil). [**The First Case of Chagas's Disease notified in the State of Rio Grande del Sur (Brazil).**]—*Arch. Uruguayos de Med., Cirug. y Especialidades.* 1939. June. Vol. 14. No. 6. pp. 558–566. [48 refs.]

Chagas's disease has not previously been recorded in the State of Rio Grande del Sur although 30 years have passed since Chagas first reported his discovery. Since then the disease has been found widely distributed in South America. The case here reported was a boy of 17 years living on a ranch 25 kilometres from the Uruguayan town of Rivera. He was accustomed to take his siesta under the trees or at a neighbouring ranch, and he is believed to have become infected in the

latter. When he came under the author's observation he presented the typical signs of the infection—Romaña's sign was marked, there was oedema of the lids of the left eye with dacryo-adenitis, enlargement of the left pre-auricular gland and of other glands, submaxillary, axillary and inguinal; spleen palpable and painful. Blood injected into the peritoneum of white rats was followed in 11 days by *T. cruzi* in their peripheral blood. The temperature did not rise above 38°C., and recovery was steady. In 17 days the temperature was normal, spleen no longer palpable and the patient much improved in general health.

H. H. S.

i. TALICE (R. V.), MOURIGÁN (Héctor), OSIMANI (J. J.) & FERNÁNDEZ-LASCANO (F.). Investigaciones sobre la enfermedad de Chagas en el Uruguay. Primera observación en el país de forma subaguda no edematosa de la enfermedad de Chagas. [**Chagas's Disease in Uruguay. First Subacute Case without Oedema recorded in the Country.**]—Reprinted from *An. Facul. de Med.* Montevideo. 1939. Vol. 24. Nos. 11 & 12. 12 pp. With 4 figs. & 1 chart.

ii. ——, COSTA (Radamés S.) & OSIMANI (Juan J.). Nuevos casos de enfermedad de Chagas en los departamentos de Rivera, Tacuarembó y Soriano, confirmados por xenodiagnostico. [**Fresh Cases of Chagas's Disease confirmed by Xenodiagnosis.**]—*Ibid.* 6 pp. With 1 fig.

i. The patient was a girl of 11 years living on a ranch in Eden Valley, Tacuarembó Department, where bugs (*Triatoma infestans*) were numerous. The symptoms present were: generalized gland enlargement, enlarged parotids, fever, lymphocytosis, eosinophilia in convalescence, and some degree of goitre (no proof of this being trypanosomal). There was no oedema. Diagnosis was made by the xenodiagnostic method.

ii. Brief details of six more cases in children of ages ranging between 7 months and 8 years. Two of them had shown Romaña's sign in the beginning. They lived in suburbs of Tacuarembó, Mercedes and Rivera. All were confirmed by xenodiagnostic methods.

H. H. S.

TALICE (Rodolfo V.) & FUENTE-MÉNDEZ (R.). Investigaciones sobre la enfermedad de Chagas en el Uruguay. Descripción del 15o y 17o casos uruguayos. Nuevo foco de enfermedad de Chagas en el Dpto. de Soriano (zona de Agraciada). Dos formas agudas en adultos. [**Chagas's Disease in Uruguay. Two Acute Cases in a New Focus in the Department of Soriano.**]—Reprinted from *An. Facul. de Med.* Montevideo. 1938. Vol. 23. Nos. 11 & 12. 8 pp. With 6 figs. on 4 plates. [29 refs.]

TALICE (R. V.), MIRANDA (Norbertino) & COSTA (Radamés S.). Investigaciones sobre la enfermedad de Chagas en el Uruguay. Primer caso en el pais de forma aguda mortal de enfermedad de Chagas. (41o caso uruguayo, observado en el Dpto. de Rivera—Minas de Corrales.) [**Chagas's Disease in Uruguay. Forty-First Case, seen in Minas de Corrales, Rivera Department.**]—*Reprinted* from *An. Facul. de Med.* Montevideo. 1939. Vol. 24. Nos. 1 & 2. 12 pp. [33 refs.]

HERR (Annette) & BRUMPT (L.). Un cas aigu de maladie de Chagas contractée accidentellement au contact de triatomes mexicains: observation et courbe fébrile. [**An Acute Case of Chagas's Disease acquired accidentally from Mexican Triatoma.**]—*Bull. Soc. Path. Exot.* 1939. May 10. Vol. 32. No. 5. pp. 565–571. With 1 fig.

This paper gives an account of the disease contracted in the laboratory of the Faculty of Medicine, Paris, by one of the authors (A. H.). The victim was a young woman who, 14 days after she had accidentally contaminated her right eye with the infected faeces of a bug, developed pain and redness in the internal angle of the eye (dacryocystitis). Three days later she presented a swelling of the same side of the face, enlarged glands and a temperature of 40°C. Although repeated searches for the trypanosome were negative, the clinical diagnosis was so definite that treatment with Bayer 7602 (a preparation which has not yet been put on the market) was instituted on the 15th day of the disease. The temperature gradually subsided and by the 30th day had fallen to normal. Xenodiagnosis on the 37th day confirmed the clinical diagnosis. The bug in question was *Triatoma pallidipennis*, obtained from Mexico where the disease is unknown.

It is remarked that the composition of Bayer 7602 is not disclosed. The drug is rather toxic and must be used with caution. MAZZA has tried it in two cases and TORREALBA in one case, and believe that it had some therapeutic value. [There does not seem to be much evidence that it had any action in the present case.] *W. Y.*

HELMINTHIASIS.

Précis of Abstracts in this Section.

Trematodes.

HOFF and SHABY (p. 147) report on 4 patients with mental confusion, one of whom also had paraplegia. Specific treatment for schistosomiasis cured the conditions in all and this is taken as evidence of the bilharzial nature of the cord lesion, the first instance of recognition during life.

SPROULE (p. 148) has determined the cercaricidal powers of water sterilizing (chlorination) powders under various conditions. He considers that for Army water trucks the dose in the field should be that indicated by the Horrocks' test plus 2. A description of the Horrocks' test is appended. BRACKETT (p. 149) uses copper carbonate in place of copper sulphate for the destruction of snails in limited bodies of water, and formaldehyde for the destruction of schistosome cercariae. The former may be used by unskilled persons but the latter needs great care. Immediate wiping of the skin after immersion in water appears to have a remarkable effect in preventing schistosome dermatitis and it is suggested that the cercariae penetrate the skin when the water is evaporating.

SCHIAVI (p. 150) notes details of treatment of vesical schistosomiasis.

GIOVANNOLA (p. 150) records two snail hosts of *S. mansoni* in Italian East Africa.

BRUMPT and LAVIER (p. 151) report that man is as susceptible as the sheep to infection with *Fasciola hepatica* and quote 89 infections recorded since 1928. They describe the symptoms.

HSU and CHOW (p. 151) describe the cercaria of *C. sinensis*. HSU (p. 152) shows that in experimental infection the majority of Clonorchis cysts were found about the last few vertebrae of the infected fish and suggests that this may be a site of election. GALLIARD (p. 152) discusses the hosts of *C. sinensis* in Tonking.

PLOTNIKOV (p. 152) describes the clinical effects of infection with *Opisthorchis felineus*, and ZERCHANINOV (p. 152) gives details of the blood changes; eosinophilia is the most prominent feature. MIRONOVA (p. 153) reports that eggs were found in 7·5 per cent. of 501 faecal examinations in Russia.

Eggs of *Paragonimus westermanii* were found in an abdominal abscess by Ko (p. 153).

SANDGROUND & PRAWIROHARDJO (p. 153) found 190 specimens of *Echinostoma ilocanum* in a dead insane native in Java. They think the infection more widespread than is generally supposed. SANDGROUND (p. 153) has investigated the life-cycle of this trematode in Java. Rats have been infected by feeding with infected snails and 22 human cases in lunatics were diagnosed by faecal examination. *C. W.*

HOFF (Hans) & SHABY (J. A.). **Nervous and Mental Manifestations of Bilharziasis and their Treatment.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. June 29. Vol. 33. No. 1. pp. 107–111.

In 4 persons, one with myelitis and all with mental confusion, specific treatment for bilharziasis cured the conditions.

In the man with myelitis the symptoms came on suddenly, his legs giving way. Three days later he was semistuporous with mental confusion, cranial nerves with normal reactions, optic discs normal, no cerebellar signs, right arm slightly weaker than left and with slightly increased reflexes, complete paraplegia of lower limbs with loss of tone of all deep reflexes, while the plantar reflexes were extensor, and there was lessened sensation of pain and temperature in the left lower limb. The liver was greatly enlarged, there was eosinophilia to 18 per cent., the urine was normal but there were ova of *S. haematobium* in the faeces and bilharzial lesions in the rectum. In hospital the mental confusion cleared, there was on the whole some betterment of the nervous symptoms at first. When it ceased, fouadin was given in the hope that the lesion was bilharzial; under this drug improvement continued so that he became able to walk freely, if stiffly, without a stick. This evidence that the lesion was bilharzial points, the authors suggest, to this being the first instance of the recognition of bilharzial infection of the cord during life. He had never complained of bilharzial symptoms, urinary or rectal. The cure of the confusional state was effected by fouadin in all but one, and after its failure in him, to improve the mental state or the urine, which was also affected, tartar emetic was tried and "after 21 grammes had been given the mental symptoms began to clear and the urine to become free."

Clayton Lane.

LAVIER (G.). La pathologie des bilharzioses à *Schistosoma haematobium* et *S. mansoni* à la lumière des travaux récents. [**The Light thrown by Recent Work on the Pathology of Infection with** *S. haematobium* **and** *S. mansoni*.]—*Ann. de Méd. et de Pharm. Colon.* 1939. Jan.–Feb.–Mar. Vol. 37. No. 1. pp. 5–26. [96 refs.]

A useful summary for French readers of recent work on the pathology of schistosomiasis. Its ground is familiar to readers of this *Bulletin*.

C. L.

SPROULE (J. C.). **Superchlorination of Water in the Field—Effect on Cercariae.**—*Jl. Roy. Army Med. Corps.* 1939. June. Vol. 72. No. 6. pp. 384–388.

The Horrocks test* was used in this investigation. The author points out that there are many variants in work of this kind; the criterion of death of the cercariae, temperature, age of cercariae used, *p*H value of the water and the amount of foreign matter in it, which may have influenced the findings of other workers. He used water from many sources, filtered and unfiltered, and attempted conditions as nearly as possible those experienced in the field. His conclusions are :—

" It was desired to discover the value of " x " in the formula H plus " x " = dead cercariae in 15 minutes. It was found that " x " varied from 0 to 4 and it is considered that if " x " has to be fixed it will be somewhere in the vicinity of H plus 6 but even this is not certain. *It was found, however, that when using water-sterilizing powder containing* 23·85 *per cent. chlorine and working in a range of temperatures between* 27·5° *and* 6°*C. the dose indicated by the Horrocks test plus one was lethal to cercariae in* 30 *minutes or less*, and that these tests bore a definite relation to one another.

" All these tests were carried out in a laboratory where thorough mixing was ensured of the water-sterilizing powder solution and the water which was being tested.

" Until a more perfect mixing device is fitted to Army water trucks it is felt that some margin must be left in the dose for possible error or human

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* The following description of the Horrocks test is taken verbatim from the Extra Pharmacopoeia, Martindale, Vol. II, 21st Ed., p. 746 :—

Water Sterilisation for Army Use.

" Horrocks's Water Testing Method is used to determine the amount of bleaching powder required to sterilise the contents of an army water-cart.

" The method uses zinc iodide, or potassium iodide and starch solution, as reagent.—Compare *Field Sanitation* by Moor and Cooper (Baillière, Tindall and Cox).

" The test automatically adjusts the strength of the purifier to be used, to the particular water to be treated. The Horrocks's Test Case contains 6 white enamelled tumblers (170 ml.) and 1 black one (250 ml.). Bleaching powder—a levelled scoopful of about 2 g.—is rubbed fine and dissolved in the black tumbler filled to the inside mark. The white tumblers are filled with the water to be tested. One drop (1/15 ml.) of bleaching powder solution is added to No. 1, two drops to No. 2, up to 6 drops in No. 6. These are stirred and left for 20 minutes, when about 6 drops of a stock solution of potassium iodide and starch are added to each. A blue colour will indicate that after all organic matter has been destroyed an excess of available chlorine remains whereby iodine is liberated, with the formation of the blue iodide of starch. The number of the first mug of the series which shows a definite colour, gives the number of scoops of the bleaching powder required to sterilize the contents of one water-cart (110 gallons approx.). The powder should be dissolved before adding it to the water-cart, and contact for one hour should be allowed, before the water is issued to the troops."

frailty. It is therefore recommended that, if the contact period of half-an-hour is accepted, the dose to be used in the field when working with fresh water-sterilizing powder should be that indicated by the Horrocks test plus two."

[See also this *Bulletin*, 1938, Vol. 35, p. 600.] *C. W.*

BRACKETT (Sterling). **Methods for controlling Schistosome Dermatitis.** —*Jl. Amer. Med. Assoc.* 1939. July 8. Vol. 113. No. 2. pp. 117–121. With 1 fig. [16 refs.]

"Copper carbonate is recommended as a chemical to replace copper sulfate for killing snails in the control of schistosome dermatitis because it may be used safely by relatively unskilled persons and one application may be sufficient. Chemical treatment for destroying snails may be effective only in small isolated bodies of water or in larger lakes where the snails are concentrated in beds. In larger lakes where the snails are too widely distributed to be destroyed, it is suggested that the cercariae may be killed daily with solution of formaldehyde if enough cases of dermatitis occur to justify the procedure. This substance must be used with extreme care. Where these methods of control are unavailable or impracticable or the number of cases of dermatitis too few, vigorous wiping immediately after coming from infested water may be a useful prophylaxis."

"The following rule may be used in determining approximately the amount of copper carbonate to be added to the water: Calculate the number of cubic feet of water overlying the area to be treated and multiply this number by 0·0003 pound. This will give approximately the number of pounds of the copper carbonate necessary to saturate the volume of water in question. In our experiments so far, my associates and I have used about four times this amount in order to secure an excess which would serve as a constant source of copper ions. This estimate is merely a guess at the amount of excess necessary, but it seems to be satisfactory. If the material used is a commercial grade which is not 100 per cent. copper carbonate, the difference will have to be accounted for by using a proportionately larger amount. There is no reason why the most inexpensive grade obtainable should not be used unless it contains dangerous impurities."

In addition to this advice for the chemical killing of snails, another rule is given for calculating the amount of formaldehyde needed to kill free cercariae. The good effect of mere drying the skin immediately on coming out of the water is shown by this experiment.

"For this test, numbers of Cercaria stagnicolae that had recently emerged from beach snails Stagnicola emarginata were placed in a pail of water. Both feet of the experimental subject were immersed in the water for ten minutes, and then removed. The left foot was wiped dry, while the other was allowed to dry by evaporation. Severe itching was soon felt on the right foot but not on the left. By the next day about 120 lesions could be counted on the right foot, which had not been wiped, and only one on the foot that had been wiped. From this study it is concluded that schistosome cercariae penetrate the skin of human beings largely if not entirely when the water is evaporating."

C. L.

RAFAEL RÍSQUEZ (Jesús). Notas para la historia de la bilharziosis en Venezuela. [**On the History of Bilharziasis in Venezuela.**]—*Gac. Med. de Caracas.* 1939. Mar. 31. Vol. 46. No. 6. pp. 88–91.

ALCAY (L.), MARILL (F.), MUSSO (J.) & CASTRYCK (R.). Découverte d'un foyer de bilharziose vésicale autochtone en Algérie. [**A Focus of Vesical Bilharziasis in Algeria.**]—*Bull. Soc. Path. Exot.* 1939. June 14. Vol. 32. No. 6. pp. 608–612. With 3 figs.

The place is Saint-Aimé-de-la-Djidiouia, a village of 1,729 inhabitants. The urines of 96 males were examined there. In 42 of them the ova of *S. haematobium* were found, in 10 more there was blood, in 44 the examinations were negative. *C. L.*

BERNARD (L.), ALCAY (L.), GUISONI (F.) & MANYA. Note sur un cas de bilharziose urinaire algérienne. [**A Case of Urinary Bilharziasis in Algeria.**]—*Bull. Soc. Path. Exot.* 1939. June 14. Vol. 32. No. 6. pp. 606–607.

DARTEVELDE (Edmond). Sur les mollusques de deux foyers à bilharziose du Bas-Congo. [**The Molluscs of Two Bilharzial Foci in the Lower Congo.**]—*Ann. Soc. Belge de Méd. Trop.* 1939. June 30. Vol. 19. No. 2. pp. 157–160.

The two foci of vesical bilharziasis are Kimpata and Mateba. Among the snails found in the former was *Physopsis africana* ; it was not found in the latter and the intermediate host there remained doubtful. *C. L.*

SCHIAVI (Ciriano). La bilharziosi vescicale nel Fezzan—note di profilassi, clinica e terapia. [**Vesical Schistosomiasis in Fezzan.**]—*Arch. Ital. Sci. Med. Colon. e Parassit.* 1939. Apr. Vol. 20. No. 4. pp. 205–211.

In 40 cases treatment has been by intravenous injection, every third day, of stibional (0·018 gram of antimony to the cc.) given fasting in a first dose of ½ cc. rising by increments of ½ cc. to 3 cc. in adults and 1 cc. in children, the course comprising 20 injections ; while on one of the intermediate days was given an intramuscular injection of sodium formate and glycerophosphate and on the other one of lecithin. An injection is apt to be followed, particularly in adults, by coughing, alteration in pulse rate, transitory spasm of the glottis, and some clouding of consciousness. In 35 other cases there was a course of intramuscular emetine hydrochloride made up of 5 daily injections and 5 days without treatment, the course taking a month and being repeated after a month's pause, the adult dose being 8 cgm. Prevention and the clinical signs and symptoms are also considered. *C. L.*

GIOVANNOLA (Arnaldo). Ospiti intermedi dello *Schistosoma mansoni* in Africa Orientale Italiana. [**Intermediate Host of** *S. mansoni* **in Italian East Africa.**]—*Riv. di Parassit.* Rome. 1939. July. Vol. 3. No. 2. pp. 139–144. With 2 figs. & 1 plate. English summary (5 lines).

" The A. establishes the fact, that in Eritrea the *Schistosoma mansoni* is transmitted by the *Planorbis ruppellii* (DUNKER 1848), and in Harar (Ethiopia) is transmitted by the *Planorbis adowensis* (BOURGUIGNET 1879). He reports a few characteristics which make possible the identification of the two snails by their shells."

GIOVANNOLA (Arnaldo). Schistosomiasi intestinale da *S. mansoni* nell'Harar e sua trasmissione. [**Presence and Transmission of Intestinal Infection with** *S. mansoni* **in Harar.**]—*Rendiconti Istituto di Sanitá Pubblica.* Rome. 1938. Vol. 1. Pt. 3. pp. 805–810. With 1 fig.

In November 1936 there were observed what are held to be the first instances in Harar of infection by *S. mansoni*. It affected the bowel.

Two brothers of 12 and 10 suffered from itching of the skin after bathing a month earlier in a particular pool in a partly dried water-course. They both had in their faeces ova of *S. mansoni*. That pool contained a *Planorbis adowensis* and a certain number of them were then collected and verified confidently as negative. Of them 34 were placed in dilute faeces got from one of the brothers ; 30 days later 3 of them began to emit cercariae of *S. mansoni*, the first instance, it is held, of this snail being an intermediate host of *S. mansoni*. *C. L.*

BRUMPT (E.) & LAVIER (G.). Prophylaxie de la distomatose hépatique humaine due à la grande douve. [**Prophylaxis of Human Infection by** *Fasciola hepatica.*]—*Bull. Acad. Méd.* 1939. June 20. 103rd Year. Vol. 121. No. 23. pp. 843–846. With 1 map.

The writers know of 89 infections of man by *Fasciola hepatica* reported in the literature since 1928, and discuss its prevention.

They hold that man is as susceptible to infection as the sheep and that he gets his infection from eating raw watercress growing in places to which sheep have access, the miracidium which had escaped from the eggs passed by the sheep having encysted on the cress. This vegetable if grown in proper nurseries, chemically manured and from which sheep are excluded, is safe. The increase of infection noted latterly has, it is held, been due to more general faecal examinations in persons suspected of this infection and not to any spread of the disease, though it is the case that the consumption of watercress has increased. The early symptoms, before eggs appear and while the larval fluke is establishing itself in the liver, are fever, a toxaemic appearance, a very painful liver, and sometimes signs at the base of the right lung. These disappear, and with the flukes matured and settled in the bile passages, there is evidence, perhaps intermittent, of inflammation of these passages and there are eggs in the faeces.

C. L.

HSU (H. F.) & CHOW (C. Y.). **Development of** *Clonorchis sinensis* **Eggs to Cercaria Stage in Laboratory Bred Snails,** *Bithynia fuchsiana.*—*Proc. Soc. Experim. Biol. & Med.* 1939. May. Vol. 41. No. 1. pp. 158–160.

The snails used were laboratory bred as well as young.

"The cercaria experimentally produced in our snails is an oculate, lophocercous one. The oral sucker is protrusible. On the dorsal margin of the mouth opening there are 4 small, penetrating teeth arranged closely in a horizontal row and, in addition, there are 3 other horizontal rows of minute teeth in that region. The cephalic glands are 14 in number and their ducts are arranged in 4 groups in the formula, 3+4+4+3, and open into the dorsal margin of the mouth opening. The outer margin of the ventral sucker is not well differentiated. The tail possesses a dorso-ventral fin along its posterior half.

"From the above description, it is evident that while the important characteristics of the *Clonorchis* cercaria experimentally produced in our snails do not agree with those described by Muto and Faust and Khaw, they do agree well with those given by Yamaguti, and therefore we may conclude that Yamaguti's description is certainly based on a study of the genuine cercaria of *C. sinensis.*" *C. L.*

HSU (H. F.). **Studies on Certain Problems of** *Clonorchis sinensis.* **VII. Further Advance in the Study of the Life-Cycle of** *Clonorchis sinensis.*—*Chinese Med. Jl.* 1939. June. Vol. 55. No. 6, pp. 542–545. With 2 figs.

In a controlled experiment *Pseudorasbora parva* was infected with Clonorchis, to the extent of 351 cysts in a fish 28 mm. long and weighing 0·36 gram. Most of the cysts were found about the last few vertebrae, and it is suggested that this may be a site of election and worthy of special search in larger fish. *C. L.*

GALLIARD (H.). Recherches sur l'étiologie de la distomatose hépatique au Tonkin. [**On the Causation of Distomiasis of the Liver at Tonking.**]—*Ann. Parasit. Humaine et Comparée.* 1939. May 1. Vol. 17. No. 3. pp. 236–244. With 1 text fig. & 4 figs. on 2 plates. [15 refs.]

The fluke considered is *Clonorchis sinensis.* The cercaria has been found in 4 of 600 *Bithynia chaperi* and in 1 of 250 *Melania tuberculata* ; the former being by far the more abundant is the more important and its absence from the higher parts of Tonking explains the localization of the infection to the Delta. The metacercariae have been found in the fish *Culter brevicauda*, and it is suspected that *Carassius auratus*, the classical host, and *Anabas scandens* are also implicated. *C. L.*

PLOTNIKOV (N. N.). La clinique de l'opisthorchose. [**The Clinical Side of Opisthorchis Infection.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1939. Vol. 8. No. 1. [In Russian pp. 69–77. French summary p. 77.]

The symptoms found in 191 cases of infection attributed to *Opisthorchis felineus* were chronic inflammation of the gall bladder and bile ducts, leading up to cirrhosis of the liver. Chronic pancreatitis is common, and the author has found 1 to 78 of the flukes in 36 per cent. of the infected persons. He refers to the parasite as *O. tenuicollis felineus* (Rivolta, 1894). [The prior designations were *Distoma tenuicolle* Rudolphi, 1819 ; *Distoma felineum* Rivolta, 1884 ; *Opisthorchis tenuicollis-felineus* Looss, 1899. See Hygienic Laboratory Bulletin No. 37, Washington, by STILES and HASSALL.] *C. L.*

ZERCHANINOV (L. K.). Le tableau du sang en présence de l'opisthorchose. [**Blood Picture in** *O. felineus* **Infection.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1939. Vol. 8. No. 2. [In Russian pp. 210–219. With 4 figs. [12 refs.] French summary pp. 219–220.]

The result of blood examinations of 147 of the inhabitants of Tobolsk infected with *Opisthorchis felineus.*

In 22 per cent. of them there was anaemia, though in infected guineapigs the amount of haemoglobin was increased from the 10th

day onwards, the number of red cells remaining normal. There was little change in the white cells, except for eosinophils, which were increased to as much as 67·4 per cent. the maximum having been found on the 25th to 27th day, the numbers then decreasing. In 2 of 46 examined there was urobilin in the blood. *C. L.*

MIRONOVA (M. N.). L'opisthorchose dans la région de Dnjepropetrovsk (District de Nikopol). [**Opisthorchis Infection in Dnjepropetrovsk.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1939. Vol. 8. No. 1. [In Russian pp. 64–68. French summary p. 68.]

Eggs identified as those of *Opisthorchis felineus* were found in 7·5 per cent. of 501 faecal examinations. The propagation of the parasite is attributed to eating freshly salted or freshly dried fish. *C. L.*

LAVIER (G.), BARIÉTY (M.), CAROLI (J.) & BOULANGER (P.). Distomatose hépatique et syndrome de Loeffler. [**Distomiasis of the Liver and Loeffler's Syndrome.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1939. May 15. 55th Year. 3rd Ser. No. 15. pp. 739–745. With 1 fig.

KO (Eisho). *Paragonimus Westermanii* **Abscess in Lower Abdominal Wall.**—*Taiwan Igakkai Zassi* (*Jl. Med. Assoc. Formosa*). 1939. Apr. Vol. 38. No. 4. [In Japanese pp. 539–543. With 1 fig. English summary p. 544.]

The eggs of this fluke were found in discharge from an abscess on the left side of the lower abdomen and in the sputum. *C. L.*

SANDGROUND (J. H.) & PRAWIROHARDJO (Soewadji). **On the Occurrence of Human Echinostomiasis in Java. Preliminary Report.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1939. June 13. Vol. 79. No. 24. pp. 1497–1503. With 3 figs. on 1 plate.

"*Echinostoma ilocanum* (GARRISON) 1908, a trematode parasite of the alimentary tract of man is well known from certain localized areas in the north western provinces in the island of Luzon (Philippines).

"The finding by BRUG and TESCH (1937) of eggs corresponding with those of *E. ilocanum* in the faeces of a large proportion of the inhabitants of the region of Lake Lindoe (Central Celebes) suggested that this parasite is more widely distributed, but since the adult worms were not secured for positive identification by BRUG and TESCH, the question remained undecided.

"A case is here reported where, at autopsy in the Pathological Institute at Batavia, 190 specimens of *E. ilocanum* were found in the small intestine of an insane native who had always lived in Java.

"Investigations on the life-history of the parasite are now being undertaken."

SANDGROUND (J. H.). **On the Occurrence of Human Echinostomiasis in Java. II. The Discovery of an Endemic Focus of Infection with** *Echinostoma ilocanum* **and the Elucidation of the Parasite's Lifecycle.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1939. July 11. Vol. 79. No. 28. pp. 1722–1734. With 9 figs. on 1 plate.

"After outlining the life-cycle of *Echinostoma ilocanum* as traced by TUBANGUI and PASCO (1933) in the Philippine Islands [this *Bulletin*, 1934, Vol. 31, p. 378], the author describes his own observations and experiments on the life-cycle of this parasite in Java.

"The early developmental stages have been found naturally occurring in a large proportion of the planorbid snail *Anisus* (*G*) *convexiusculus* Hutt., collected in a small pool at Bronbeek—a suburb of Batavia. Cercariae discharged from this species of snail proceed to penetrate and encyst as metacercaria in other snails, chief among which are *Lymnaea rubiginosa brevis* Mous, *Viviparus javanicus* Phil., and *Pila conica* Gray. All of these species of snails occur living in close association with each other and all have been found naturally infected with echinostome metacercaria in the same pools.

"Laboratory raised white rats have been experimentally fed with the above named snails which were found carrying metacercaria in nature and have become infected with *Echinostoma ilocanum*.

"A transient human infection with Echinostomes was induced by ingesting metacercariae from *Anisus* (*G*) *convexiusculus*. A large proportion of field rats, *Rattus r. brevicaudatus* harbour the same parasite.

"By using a sedimentation method for concentrating eggs in the faeces, 22 cases of human echinostomiasis were diagnosed among lunatics at the Lenteng Agoeng Rural Colony for the insane outside Batavia.

"On treatment of eleven cases of human echinostomiasis with 2 to 4·5 cc. of tetrachlorethylene (C_2Cl_4) patients have passed from 13 to over 270 worms!

"Attendants at the lunatic asylum and members of the normal population living near Lenteng Agoeng have not been found infected with echinostomes on account of differences in food habits and culinary practises.

"The consumption by lunatics of uncooked snails has been directly witnessed."

The sedimentation method consisted in filtering through an ordinary wire tea-strainer a suspension of faeces in water having a strength of 1 in 10 to 1 in 25, standing the suspension in a 100 cc. conical urine sedimenting glass and pipetting off the sediment after ten minutes.

C. L.

TUBANGUI (Marcos A.) & AFRICA (Candido M.). **The Systematic Position of Some Trematodes reported from the Philippines.**—*Philippine Jl. Sci.* 1938. Oct. Vol. 67. No. 2. pp. 117–127. With 3 figs. [12 refs.]

REVIEWS AND NOTICES.

GIORDANO (Mario) [Colonnello Medico della Regia Marina]. **Patologia e parassitologia dei paesi caldi.** [Pathology and Parasitology of Warm Climates.] Second Edition revised and enlarged from First Edition by G. FRANCHINI & M. GIORDANO.—pp. xxiv+1015. With 592 figs. (12 coloured) and 3 coloured plates. 1940. Milan–Rome: Editoriale "Arte e Storia." [L. 180.]

For an author to undertake single-handed the preparation of a work on the *Pathology and Parasitology of Warm Climates* would appear to be a veritable labour of Hercules and, in the reviewer's opinion, the work has on the whole been accomplished with success. In these days tropical medicine, tropical parasitology and tropical pathology cover so extensive a field that no one author can be expected to be able to cultivate it all equally, and consequently it is but natural to find inequalities of accomplishment in a work which attempts to deal with so much.

In the space at our disposal it is not possible to review in detail a book of more than a thousand pages, which deals with animal as well as human parasites, with the diseases which they convey or give rise to, the symptoms, pathology and treatment of these diseases. We can do little more than tell of the contents and indicate a few of the points which particularly recommend the work to those practising in warm climates.

The book is a " revision and amplification " of a work by FRANCHINI and the present author. As we have not seen this we cannot say what revision and how much amplification have been carried out. In the preface the author states that he classifies and describes the chief parasites, vectors of disease, " limiting his remarks to what is of practical value to the medical man." He has done this and more, for animal parasites have been included, quite apart from their human application.

The whole is divided into ten main parts, with preliminary chapters on climatology and on the hygiene of colonies and of expeditions, military and exploratory, and an appendix of a hundred pages on health legislation. Part I concerns *Protozoology* and is subdivided into seven chapters treating of spirochaetes, the dysenteries and amoebiasis, leishmaniases and the flagellates, the Sporozoa including not only the Plasmodia in detail but notes also on Haemoproteus, Leucocytozoon, Haemogregarines, Piroplasma, Theileria and others. As one expects, in an Italian work, human trypanosomes are given the generic name of Castellanella ; those infecting animals still retain their name. It is peculiar to see *Plasmodium tenue* given validity as a species ; *Pl. ovale* is mentioned, but not described. Therapeutic malaria is referred to but very inadequately, being discussed in half a page. Bejel is not referred to in the yaws, or any other, section. A brief page is given to Cnidosporidia and a short chapter to Balantidia, followed by one on parasites of doubtful classification—Bartonella, Rickettsia and the diseases associated therewith. In the account of endemic typhus, nothing is said of Lewthwaite's important studies in Malaya.

Part II, *Helminthology,* follows the usual lines, describing the nematodes and flatworms—trematodes and cestodes—and containing a chapter on examination for and preservation of ova and an appendix on Annellidae. The illustration on p. 386 gives the ovum of *Ancylostoma duodenale* a double wall ; that on p. 392 is better. Part III, *Entomology,* is clearly written, full enough but not too detailed, describing the various Orders, Suborders, Families, Genera and Species of importance and the diseases they convey ; also others of interest, though of less importance, together with a serviceable appendix on dissecting, preparing and mounting insects. Part IV, on *Poisons of Animal and Vegetal Origin* is the least satisfactory in the book. It is, of course, impossible to give more than the briefest sketch of the various snakes (Crotalines are disposed of in a couple of lines), the symptoms and treatment of snake-bite (scorpions, centipedes and millipedes are dealt with in the Entomological Part, in a chapter on Poisonous Arthropods), poisonous fish, the vegetal and arrow poisons in thirty pages. The illustrations are numerous, 44 in this section, and very good and compensate to some extent for the poverty of the letterpress. Part V, *Bacterial Diseases,* is *multum in parvo.* In 82 pages are described the bacterial dermatoses, leprosy, enteric fevers, bacillary dysentery, plague, cholera, tularaemia, undulant fever,

melioidosis, glanders, anthrax, tetanus, rhinoscleroma and pudendal granuloma. Leprosy occupies 20 pages, cholera 14 and plague 12, so that all the rest are compressed in 36 pages—adequate description is therefore not possible. *Deficiency diseases* comprise Part VI (16 pages), also very compressed. Epidemic dropsy is not up-to-date, pellagra occupies two pages, half of each being given up to illustrations, and nothing is said of the pellagroid conditions which are important and fairly common. *Mycoses*, Part VII, *Virus diseases* (VIII) and *Neuroses* (IX) follow. There is little to remark concerning these, but sprue, strangely, is classed among the first. The final part (X) deals shortly with taxidermy, embalming and the preparation of permanent anatomical specimens.

With the above reservations, some at least refer to matters of relatively minor importance, we can heartily recommend this book. Misprints are few, the print clear, illustrations many and remarkably good, with very few exceptions, and the information usually up-to-date, even to the use of the sparklet bulb method of disinsectation of aircraft while in flight. The author is to be congratulated on the completion of a work which will add fresh laurels to his fame. As no man can be master of all trades, so no scientist is possessed of knowledge to deal competently with all the branches of tropical medicine, and only a panel of experts could have produced a better book. *H. H. S.*

GEAR (H. Sutherland) [M.D., B.Sc., (Rand); D.P.H. (Lond.), D.T.M. & H. (Eng.)]. **The First General Epidemiological and Morbidity Survey of China.** Chinese Medical Association. Special Report Series No. 11. 183 pp. With 21 figs. [In China N.C. $2·00. Abroad U.S. $1·00 or 4*s*.]

This survey had its origin in the Henry Lester Institute of Medical Research, Shanghai. The author was appointed Associate in Preventive Medicine and Medical Statistics and part of the program of his department was a survey of disease incidence and prevalence in China, to be carried out in collaboration with the China Medical Association. The promoters of the survey visualized a demonstration of the importance of morbidity as contrasted with mortality statistics and of the rôle of a general practitioner or hospital officer in a research program.

The survey was carried out through the hospitals, both Government and Mission, which are found in the towns from Peiping to Hong Kong and westwards to Yunnan-Fu. Since 85 per cent. of the Chinese inhabit rural areas this is a drawback, but on the other hand general practitioner service does not exist apart from hospitals, so that Chinese hospitals afford a better sample of prevalent diseases than do hospitals in England. Support was obtained from 27 hospitals, of which 17 sent complete returns in 1933 and 25 in 1934. The object in view was to obtain a monthly record of every new patient, his occupation, age and sex and type of disease with the geographical and seasonal distribution. Cards were employed, dispatched and returned monthly, over half a million in all. The classification of the diseases was based on the International List of the International Commission for Classification of Causes of Death, Paris, 1929, and a disease list of 50 titles was compiled (printed as an appendix). Each month each hospital return was analysed by age groups and for each sex, and these data for the years 1933 and 1934 with tables and diagrams

occupy a chapter. The unusual sex incidence, two males to one female, is attributed to the character of the population of large cities in China where poverty is so great that workers are unable to have their families with them.

As to age the largest number were adolescents or young middle-aged.

The next two chapters discuss the general disease incidence for 1933 and 1934. The chief causes, in the order named, were diseases of the skin, injuries, digestive diseases, venereal, eye, miscellaneous, tuberculosis and trachoma. Differences of incidence between South China, the Yangtse region and North China are noted.

The importance of tuberculosis is stressed; it came fifth among causes of disease in 1933—10,200 cases were reported among 208,000 patients. "Respiratory tuberculosis formed 65·5 per cent. of all tuberculous patients, a proportion agreeing closely with an Indian series from Calcutta living under very similar conditions to the Chinese, but different from a Dutch East Indies group where respiratory tuberculosis formed 85 per cent."

Under venereal disease it transpires that syphilitic disease of the central nervous system was one of the most frequent forms recorded (324 in 8,205 syphilitics), an interesting result in view of the supposed rarity of this form.

Every hospital reported malaria but in more than half the records the variety is not named. Of the 1,325 fully diagnosed the benign tertian had its peak in July, quartan in October and subtertian as late as November. The chapter on "some helminthological conditions" shows how much remains for investigation. It demonstrates too the value of cooking. Pork is largely eaten in China, always well cooked, and *Taenia solium* infestation is rare. In S. China where Clonorchis infection is frequent fish is eaten raw and so with the water chestnut in regions where Fasciolopsis infection abounds.

Beriberi, the author writes, is in China a complex of deficiency conditions. Only 3 and 4 hospitals in the two years failed to report it. There were 1,252 males to 24 females and the great majority were in the 15–24 years group. Kala azar on the other hand occurred chiefly in the 5–14 years group, but here again there were six times as many males as females.

Other chapters treat of diphtheria, measles, scarlet fever, anterior poliomyelitis, encephalitis epidemica and cerebrospinal meningitis, tumours, ear and eye diseases. In his discussion of the general results of the survey the author stresses the value of statistical and epidemiological investigations as a pre-requisite for measures for the reduction of human sickness, so that one concludes that in modern China this is insufficiently realized. As one result "it is arguable whether both national and missionary organizations would not be securing greater returns for their expenditure, equipment and staff through a system of clinics and dispensaries rather than through hospitals." Thus could be spread the gospel of sanitation and hygiene.

There are six Appendices, concerned with the survey card, instructions for the survey and the conversion of Chinese age.

Everyone who is concerned with the prevention of disease in China must consult this survey, and its perusal could not fail to be of utility to anyone organizing a similar survey in a relatively undeveloped country.

A. G. Bagshawe.

DÉROBERT (L.) [Ancien Chef de Laboratoire à la Faculté de Médecine de Paris]. **Les troubles de la thermorégulation (coup de chaleur).** [The Disorders of Heat Regulation (Heat Stroke).]—218 pp. With 8 plates & 5 figs. 1939. Paris: Masson et Cie, 120 Boulevard Saint-Germain. [60 *fr.*] [Review appears also in *Bulletin of Hygiene.*]

This work treats very fully of the pathology of disorders of heat-regulation, particularly with regard to heat-stroke. The author first surveys the salient facts of heat control in the human body and summarizes the physiological effects of exposure to high temperatures. The author seems to give unqualified credence to the theory of "secondary chemical regulation" of heat production. The belief in the inhibition of metabolism at high temperature has not as yet obtained general support.

The physiological sections are followed by descriptions and classification of the considerable number of clinical conditions in which hyperpyrexia is an outstanding feature. In this useful chapter the author deals with hyperthermia induced by a variety of physical, chemical and hormonal agencies, fever and heat-stroke and its allied syndromes.

The theme which gives this book its interest is the pathogenesis of heat-stroke. After discussing the current theories the author describes his own experiments on animals exposed to high temperatures. The histopathological findings lead him to the conclusion that the essential phenomena of heat-stroke are to be accounted for by the disintegration of protein. He regards the heat-stroke syndrome as closely related to anaphylactic and protein shock. The resemblances of the symptoms to surgical shock and the condition of collapse following extensive burns are also discussed.

The author has marshalled considerable evidence for his view. On his hypothesis he has most interesting explanations for such questions as acclimatization to heat and the immunity to heat stroke achieved by DREOSTI on the Witwatersrand by giving new mine workers a preliminary exposure to hot conditions more severe than those encountered subsequently in the working places.

J. S. Weiner.

DUBOIS (A.), [Professeur à l'Institut de Médecine Tropicale Prince Léopold]. La lèpre. Diagnostic — traitement — prophylaxie. [**Leprosy. Diagnosis—Treatment—Prophylaxis.**]—108 pp. With 25 figs. 1939. Brussels: Imprimerie Industrielle et Financière, 47 rue du Houblon. [15 fr.]

This small book is written as a practical guide to medical men engaged in the struggle against leprosy in the Belgian Congo, where the author has worked for years and paid especial attention to that disease.

A brief historical chapter is followed by one on distribution which is mainly concerned with the Belgian Congo, where the number of cases is given as 60,000, or 5·5 per mille; a much lower figure than the usually accepted one of about 200,000. A short bacteriological section is in accordance with accepted views. The important subject of epidemiology is dealt with more fully, and the relation between a dense population and high leprosy rates is emphasized. In another place

the close relationship between high leprosy rates and high rainfall in India especially is quoted, and it is pointed out that the exceptionally high leprosy rate in the Nepoko province of the Belgian Congo is associated with high rainfall and a low state of morality. In quoting the table of Rogers of 700 cases in which the source of infection was traced, the author makes a slight slip in saying these were cases in India, for they were collected from several decades of world-wide literature. This chapter is well up to date. The author records that very little fish is eaten in the badly infected Nepoko area. The recommendations concerning epidemiological enquiries of the Cairo Congress of last year are quoted. A short account of the evolution, histology and biochemistry follow, and absence of any reliable serological test of diagnostic importance is pointed out, and the prognostic value of the leprolin test is mentioned. All the foregoing sections include the important established facts in a succinct form.

The clinical section is rightly given most space in a practical book, and it is well illustrated by photographs of the disease in different stages as seen in the Negro race. Special attention is paid to the early symptoms and to the importance of early recognition of the disease. Short chapters on diagnosis and prognosis are followed by a fuller one on treatment. This is a good summary of the subject and the now generally accepted view that only the chaulmoogra derivatives have been proved to be of curative value is endorsed. Notes on pharmacology are followed by clear directions on dosage and the methods of using these preparations. The concluding section on prophylaxis makes it clear that in the case of the Belgian Congo accommodation in agricultural villages, near a dispensary to allow of treatment, is the most practical plan, and they now provide for one-third of the known cases.

Altogether this little book is practical and up to date, and reveals the author's knowledge of British and American, as well as of French work on the subject. *L. Rogers.*

BUXTON (Patrick A.) [M.A., M.R.C.S., L.R.C.P., D.T.M. & H., Director, Department of Medical Entomology, London School of Hygiene and Tropical Medicine, Professor of Medical Entomology, University of London]. **The Louse. An Account of the Lice which infest Man, their Medical Importance and Control.**—pp. ix+115. With 28 figs. 1939. London: Edward Arnold & Co. [7*s.* 6*d.*]. [Review appears also in *Bulletin of Hygiene.*]

The war of 1914–18 called forth in all countries an immense output of research on the louse—its biology and the best means of combating it under war conditions. The 20 years which followed, although they have added much to our knowledge of the louse-borne diseases, have added almost nothing to the efficacy of existing methods of louse control. With the renewed outbreak of war the louse will again become a military problem—how important a problem will depend upon which of the louse-borne diseases make their appearance among the troops. Already the evacuation of children from the large towns has brought a realization of how widespread is infestation with head-lice among the civil population of this country. It is singularly fortunate therefore that just at this moment Professor P. A. Buxton has been able to produce a monograph on the louse, which brings together all the scattered information on this subject which everyone who has to deal with lice will wish to know. The author states in his

preface that this work formed part of a book on medical entomology which is in preparation, but it has been adapted to form a complete book in itself.

The author accepts the view that the head-louse and body-louse are closely related physiological races of a single species, *Pediculus humanus*. For most purposes they may therefore be considered as one. Their external and internal anatomy and their physiology are described. Their biology is considered in two sections dealing with individual biology and collective biology. The former consists in the relation of the physiology of the louse to its reactions in its environment and to the range of conditions under which it is capable of existence. The collective biology is the study of populations of lice and the fluctuations to which these are subject. It is in this field that Professor Buxton has himself contributed most in recent years and it is particularly valuable to have a lucid summary of his conclusions to date. The relation of lice to relapsing fever, typhus and trench fever is fully described and the value of this part of the book is much increased by an up-to-date account of the development of the Rickettsias and Spirochaetes in the louse, and short comparative descriptions of murine typhus and the tick-borne relapsing fevers. The chapter on control contains both a systematic account of the insecticidal methods applicable to the louse and a discussion of the practical measures for utilizing these methods in different circumstances. Many gaps in our knowledge on all these matters are pointed out. A chapter on the crab louse, *Phthirus*, and an appendix on the technique of rearing lice for experimental purposes conclude the book. The volume is nicely illustrated with drawings by Mr. H. S. Leeson. It is crammed with facts set out in a readable form and is destined to become the *vade-mecum* of everyone who is called upon to deal with lice from whatever point of view. *V. B. Wigglesworth.*

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